EXHIBIT 3

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF LOS ANGELES

LENORE MILEY, individually and on behalf of all others similarly situated, Plaintiff, v. BELKIN INTERNATIONAL INC., Defendant.	Case No.: 20STCV00033 Hon. Carolyn B. Kuhl

EXPERT DECLARATION OF MICHAEL PECHT, Ph.D. IN SUPPORT OF PLAINTIFF'S MOTION FOR CLASS CERTIFICATION

1. I, Michael G. Pecht, have been retained on behalf Lenore Miley, as a technical expert to analyze and opine on certain issues relating to Belkin's power banks. I was asked to opine on whether the Belkin package labeling and advertising were properly informative, as well as to give opinions and explanations regarding battery technology.

2. I am being compensated at a rate of $550 per hour for my services. My compensation does not depend in any way upon the outcome of this investigation, the opinions I express, or the content of my testimony. I expect to testify at the hearing in this investigation regarding my background, qualifications, opinions, and the other subject matter set forth in this report.

3. As part of my study, I examined and conducted tests on exemplar devices and the batteries.

My Qualifications

4. I have a BS in Physics, an MS in Electrical Engineering and an MS and PhD in Engineering Mechanics from the University of Wisconsin at Madison.

5. I worked as a civil servant electrical technician for 4 years to pay my way through college. After graduation, I spent one year working as a NASA contractor on the Astro-1 space telescope to assess reliability issues for that telescope.

6. Since earning my Ph.D., I have had over thirty years of additional experience in the area of electronics generally, including in the area of electronic materials, components, and electronics testing, and reliability. I have extensive, hands-on experience in the design, manufacture, and testing of battery cells and batteries within final products.

7. I have a Professional Engineer license for the State of Maryland, and I am a Fellow of three of the largest professional societies relevant to the subject matter in this case: the Institute of Electrical and Electronics Engineers, Inc. ("IEEE") and the International Microelectronics Packaging Society ("IMAPS"), and the American Society of Mechanical Engineers ("ASME"). These professional societies address the broad areas of batteries, including materials, components, assemblies and products; design, manufacture and testing; and quality, reliability and safety. I am also a Fellow of the Society of Automotive Engineering (SAE).

8. I am the founder and Director of CALCE Electronic Products and Systems Center at the University of Maryland, which is funded by over 150 of the world's leading electronics companies. CALCE has a battery analysis and testing laboratory.

9. I am the George Dieter Chair Professor in Mechanical Engineering at the University of Maryland, where I have taught classes on battery and electronic materials, design, manufacture and testing, and reliability and safety, at the graduate and undergraduate level, for

over 25 years. In addition, I have taught formal courses for private companies and professional organizations, including the ASME, IEEE, SMTA and IPC, the U.S. military, NASA, the FDA, and for agencies under the sponsorship of the United Nations.

10. In addition to teaching, I have consulted with over eighty major international electronics companies, including with companies on the subject of battery design, manufacture and testing; reliability and safety; for companies including Amazon, Crane Aerospace & Electronics, SAFT, Naval Surface Warfare Center, Blackberry, PCTEST Engineering Lab, Lansmont Corporation, Kimandia, Flexel, Nevro, Jarden Safety, Black & Decker, Harris RF Communication, Samsung, SKI, Eagle Pitcher, Honeywell, Dell, IBM, Oracle Corporation, Wentworth Technology, Emerson, DfR Solutions, Heartware, HEICO Aerospace, Huawei, Physio-Control, X-wave, and others. I have had numerous projects on batteries with the NSF, NASA, the FDA, and the U.S. Military. I am very familiar with the standards and datasheets associated with batteries, electronic components, products and systems.

11. I served on various National Academy of Science / Engineering (NAE / NAS) Committees (invited to participate), including the committee for reliability growth (how to improve the reliability of US military weapon systems); committee to investigate printed circuit board manufacturing in the U.S.; committee to examine US research needs in materials engineering;

12. I served as an expert for congressional investigations, including the Committee on Energy & Commerce to investigate automotive reliability and safety issues: Toyota sudden acceleration (2009 - 2010); and GM ignition – air bag recalls and NHTSA responses (2014).

13. I served as an FDA expert and also taught electronics and reliability courses and aided the FDA in assessing manufacturers of medical devices, the techniques used to qualify devices, and medical device reliability and safety.

14. I served as chief editor of the IEEE Transactions on Reliability for eight years and on the advisory board of IEEE Spectrum. I served as chief editor for Microelectronics Reliability for over 16 years and as an associate editor for the IEEE Transactions on Components and Packaging Technology. I also served as the Editor in Chief for IEEE Access for 6 years and as the editor in chief of Circuit World for 2 years. I am currently editor-in-chief of Elservier's e-Prime Journal of Electronics, Electrical Engineering and Energy, and ASME Open Journal of Engineering.

15. I have written over thirty books and over 700 articles on various subjects related to electronic product design, manufacture, test, reliability and supply chain management. My work has been cited over 50,000 times. Some of my publications on batteries include those listed in **Appendix 1**.

16. I currently have 10 U.S. patents.

17. I have been funded and served as the Principal Investigator on the U.S. National Science Foundation project titled Prognostic Methods for Battery Management Systems. I have also been funded to analyze battery behavior and develop battery models on various Navy (NAVAIR) projects.

18. I have worked on battery projects for various companies, including Amazon, Samsung, SKI, GE, Dell, Huawei, Blackberry, Black and Decker, Nervo, Nevro, Oracle, Jarden Safety, FlexEl, Lansmont Corporation, and HEICO Aerospace Company. I have also visited and audited numerous battery manufacturers around the world.

19. I have taught courses on batteries at the University of Maryland, gave tutorials on batteries at conferences, and gave numerous keynote talks at conferences and for companies on batteries. I have graduated more than 150 MS and PhD students, many of whom are working for companies, such as Apple, Dell and Samsung in the area of batteries.

20. In 1997, I received the ISHM / IEPS William D. Ashman Memorial Achievement Award for numerous contributions to academia and the electronics packaging industry. In 1999, I received the 3M Research Award for research work in the electronics reliability area that has made significant contributions to the scientific understanding of material properties and their complex behavior. In 2008, I was awarded the IEEE Reliability Society's Lifetime Achievement Award. In 2010, I received the IEEE Exceptional Technical Achievement Award.

21. I have experience with power banks, the batteries used by power bank devices, and their battery management systems.

22. A copy of my curriculum vitae ("CV") is attached to this report as **Ex. 1**.

Introduction

23. A power bank is a portable battery system that is used to provide energy to portable appliances, including laptops, smartphones, and tablets. Underwriters Laboratory (UL) 2056, titled "Outline of Investigation for Safety of Power Banks" defines a power bank as: "Also known as portable USB chargers or portable back-up battery power. A standalone, portable power supply with built-in lithium or nickel batteries and dc/dc converter circuitry for mobile use of powering electronic devices through USB or similar universal interfaces" [1].

24. The need for power banks arose primarily with the trend to make smartphones compact and light [2], which limited the space for batteries, resulting in limited battery runtime. As a result, many customers opt for power banks to enable them to charge their devices portably.

In addition, most laptop, smartphone, and tablet manufacturers do not allow for the easy and inexpensive replacement of batteries, and since batteries eventually suffer from capacity fade (e.g. the loss of capacity resulting from charge / discharge cycles), having a portable charger becomes a needed accessory for older devices.

25. Today, power banks come in various shapes and sizes and are a common source of battery backup. A power bank typically consists of a battery cell or pack in a case with circuitry to control power flow and voltage levels. The power bank can store electrical energy (deposit it in the bank) and use this energy to charge up another (e.g., mobile) device (withdraw it from the bank) [3].

26. Figure 1 shows a typical schematic of a power bank circuit, including the battery and the circuitry. The term "battery" refers to a connected group of (one or more) electrochemical cell that store electric charges and generate direct current (DC) through the conversion of chemical energy into electrical energy.

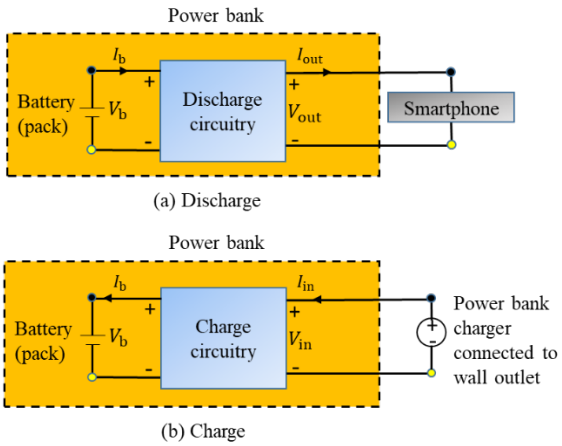

FIGURE 1. Simplified schematic of a typical power bank for discharging and charging

27. The fundamental building block of the battery is the battery cell, which is most often today based on a lithium-ion (Li-ion) chemistry due to its high energy density, low self-

discharge rate, and long cycle life. As noted, a power bank can consist of a single battery cell or multiple battery cells connected in some series and/or parallel combination. Cells are connected in series to increase the voltage of the pack; cells are connected in parallel to add capacity (amount of stored charge) of the pack. Charge and discharge circuitry is included in the power bank to regulate the input/output voltage of the power bank and manage the charging and discharging of the battery (e.g., estimating the state of charge, ensuring that the battery is not over charged or under discharged, ensuring that the battery is not used in high temperature applications, etc. [4]).

28. In Figure 1, "+" represents the positive terminal, and "-" represents the negative terminal. The voltage is the potential difference between the positive terminal and the negative terminal. Vin is the voltage measured at the input port of the power bank, and Vout is the voltage measured at the output port of the power bank. The output voltage is a constant voltage that the power bank supplies to a portable product at the output port, such as a USB port, is the output current that the power bank provides to a portable product at the output port.

29. A power bank is typically charged from a charger connected to a wall outlet, where the charger has a constant voltage and input current that the charger supplies to charge the power bank. The battery inside the power bank will have a terminal voltage and charging current.

30. Rated capacity, generally denoted as capacity, is defined by "American National Standard for Portable Rechargeable cells and Batteries - General and Specifications, Part 1-2019" as the quantity of electricity, usually expressed in Ampere-hours (Ah), which a battery can deliver under specified discharge conditions [5]. Rated capacity means the capacity, in ampere-hours or milliampere-hours, of a cell or battery as measured by subjecting it to a load,

temperature and voltage cut-off point specified by the manufacturer [IATA Lithium Battery Guidance Document – 2021]. In other words, this is the capacity that can be actually delivered.[1] And there are specific procedures for such capacity (e.g. rated capacity) testing as noted in IATA Lithium Battery Guidance Document and in other standards, including ISO 12405-4 [6], ANSI C18.2M [5] and UL 2056. [2]

31. I have reviewed Belkin's statement regarding its power banks, specifically, the one that reads:

"The Belkin promise to deliver the highest quality products translates to the way we conduct testing. We commissioned third party labs to test our power banks and are legally required as a global company to communicate the product's full spectrum of capacity. Its maximum capacity is on package and its minimum capacity is noted in fine print on the product. The minimum capacity is also known as the 'rated capacity' and is our way of testing products under the most extreme conditions to ensure that they operate above and beyond the industry standard." [BELKIN_000774.]

32. This statement by Belkin is not in accordance with accepted definitions or standards.

33. The rated capacity is not the minimum capacity and is not defined as such in any standard.

[1] Belkin apparently understood this, because they didn't use the cell capacity in their calculation to determine how many times they could charge an iPhone 7. See BELKIN_000117.

[2] (from UL 2056): Capacity Verification Test: 12.1 The marked electrical capacity of power bank, measured at the power output pin of output port, shall comply with the Standard for Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Secondary Lithium Cells and Batteries for Portable Applications, IEC 61960, Clause 7.3.1, Discharge Performance at 20 °C (Rated Capacity), and the modified test method in 12.2.

34. UL Standard 2056, titled "Outline of Investigation for Safety of Power Banks" [1] specifies that power bank manufacturers should specify the capacity of a power bank, by discharging the power bank at the rated current at the output port(s) at 20 ℃ until the output voltage of the power bank is equal to the end-of-discharge voltage.[3] In other words, the power bank capacity per this definition is not a theoretical battery capacity, but a standard definition of output capacity at the USB port. Customers depend on the power bank manufacturer to provide accurate capacity information of the power bank.

35. An example where the power bank capacity is specified properly and would be in accordance to UL Standard 2056, is shown in Figure 6 below, with English translations [7]. This manufacturer states the capacity of the power bank to be 16000 mAh at 3.6 V, and 10200 mAh at 5.1 V. The capacity "10200 mAh at 5.1 V" considers the power loss caused by the voltage conversion circuitry.

36. One can find similar types of marking on numerous other power banks, in conformance with UL standard UL 2056, including for example, Intertek PB147AC Portable Charger.

[3] Note that the end-of discharge (cut-off) voltage is never a zero value, since that could make the battery unreliable and in some rare instances unsafe.

Xiaomi Power Bank (16000 mAh)
Panasonic batteries

16000 mAh 3.6 V

Output capacity: 10200 mAh 5.1V (TYP 1A)
Conversion efficiency> 90%

Model: NDY-02-AL
Input: DC 5.0 V/2.0 A
Output: 2×DC 5.1V/2.1A MAX 3.6 A
Battery capacity: 15000/16000 mAh 54/57.6 Wh
(MIN/TYP)

FIGURE 6. An example of a Xiaomi power bank, having capacity ratings based on the voltage conversion (translated below the photo in the figure) [7].

37. One can find similar types of marking on numerous other power banks, in conformance with UL standard UL 2056, including, for example, Intertek PB147AC Portable Charger.

Review of the Specified Parameters of the Belkin Power Bank

38. This report pertains to the Belkin power bank and certain aspects of its functionality and performance. Figure 2 are photos of the packaging for the Belkin power bank. The front of the packaging states that the product is for smartphones and tablets, the capacity is 10000 mAh, and this product can charge an iPhone 7 (running IOS 10) up to 3 times. This wording declares that the power bank will deliver 10000 mAh of capacity.

39. On the backside of the packaging, Belkin specifies that there is a single input port for charging the power bank, and that the power bank should be charged at the specified voltage and current levels at the input port. When charging the power bank, the charging circuitry in the

power bank steps down the voltage of 5 V at the input port of the power bank to the rated battery voltage.

40. On the backside of the packaging, Belkin specifies that there are two universal output USB ports for charging portable electronic devices. On the backside of the packaging, Belkin specifies that the output voltage is 5 V for each port, and the output current is 2.4 A shared for the two universal USB ports. On the case of the power bank, Belkin specifies that the output voltage is 5 V, and the output current is 2.4 A maximum for each output USB port.

FIGURE 2. Photo of the marketing package of the Belkin power bank (front, back)

41. Figure 3 shows the inside of the package of the Belkin power bank. Figure 4 shows the front and back sides of the Belkin power bank.

FIGURE 3. Photo of the inside marketing package of the Belkin power bank

FIGURE 4. Photo of the Belkin power bank

42. Figure 5 shows the information provided on the backside of the Belkin power bank. The model number is F7U020 1INP11/66/110 1620DO. Certifications including FCC (Federal Communications Commission)[4], CE (European Conformity)[5], KC (South Korea certification)[6], EAC (Russian: Евразийское соответствие) [7], BC (battery charging)[8], RCM (Regulatory Compliance Mark) [9], and WEEE[10] are printed.

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[4] The FCC is responsible for rating personal computers and other equipment as either Class A (official/industry use) or Class B (any use) [8], indicating how much radiation the equipment emits. The power bank is rated as Class B, which means that the product is intended for use in a residential environment and must meet much stricter radiation emission limits than the Class A products [9].

[5] The CE marking is a European marking of conformity, indicating that the product complies with the essential requirements of the applicable European laws or directives with respect to safety, health, environment, and consumer protection [8]. The CE marking demonstrates that a product complies with a common set of laws required by all the countries in the European Economic Area to allow free movement of trade within these countries. CE marking is intended to add a level of safety for consumers and other end-users [10].

[6] Electrical and electronic products entering south Korea are subject to KC certification, a mandatory certification scheme ensures that only products certified by accepted certification bodies can enter Korean market [11].

[7] The "Single sign of products circulation on the territory of Eurasian Economic Union" (or "EAC Sign") certifies that the product has passed all conformity validation procedures established by the Customs Union Technical Regulations which is confirmed by documents of relevant conformity assessment form [12].

[8] The "BC" inside a circle indicates that the battery charging system in the power bank has been tested for energy efficiency at a California Energy Commission (CEC) approved laboratory [13]. The product is submitted to the CEC and upon approval the model is listed in the appliance database. When approved, each product must be labeled with a "BC" inside a circle. California regulates the energy efficiency of battery charging systems beyond that of the federal government.

[9] This symbol is called RCM [14], and is a trademark owned by government regulators in Australian and New Zealand as a visible assertion that products meet the Australian and New Zealand electrical safety and electromagnetic compatibility regulations.

[10] The crossed-out trash bin refers to European WEEE Product Directive, mandating that the device be recycled or disposed of in a responsible way because of the environmentally detrimental materials it contains [15].

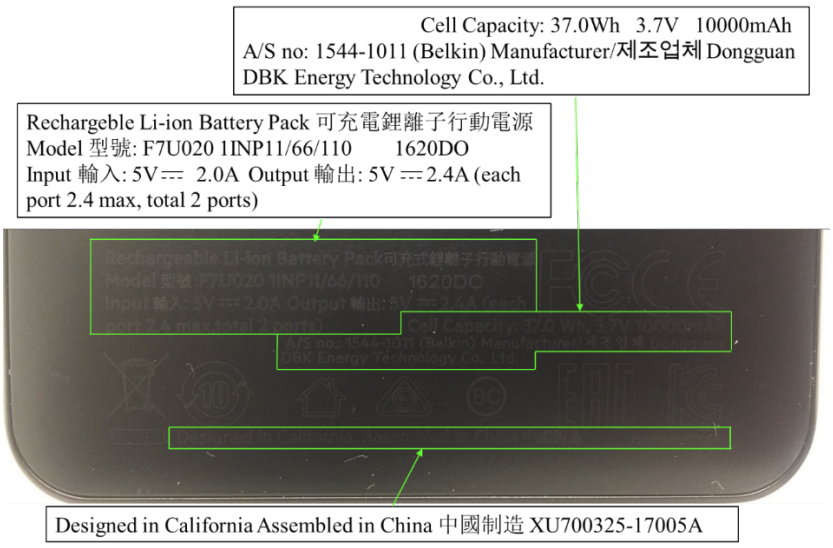

FIGURE 5. Information given on the Belkin power bank

Review of the Specified Parameters on the Power Bank

43. The information on the Belkin power bank specifies the cell voltage to be 3.7 V, with a cell capacity of 10000 mAh and cell energy of 37.0 Wh. This is not the capacity that will be delivered for charging a product such as a cell phone, and the reasons are as follows.

44. For a product that has no power losses in the circuitry (e.g., the discharge converter), and for a battery that discharges from 100% SOC (full charge) to 0% SOC (full discharge), the conservation of energy equation gives:

$$E_{out} = E_b \tag{1}$$

$$\int_{t_0}^{t_{end}} V_{out} I_{out}\, dt = \int_{t_0}^{t_{end}} V_b I_b\, dt \tag{2}$$

where is the energy measured at the output USB-C port, is the discharge energy of the battery, is the voltage measured at the output USB-C port, is the current measured at the output USB-C port, is the battery terminal voltage, is the battery discharge current. The energy is the

integration of the instantaneous power over time, and the instantaneous power is the product of the instantaneous voltage and current. The integral in equation 2 ranges from the start of discharge to when the battery voltage reaches the discharge cut-off voltage.

45. The output capacity is the total charge (ampere-hours) that can be withdrawn from a fully charged battery pack (e.g., power bank) for a specified set of test conditions (e.g., discharge rate, temperature, and discharge cut-off voltage[6]. The output capacity is calculated as the integral of the battery current over the discharge process:

$$C_{out} = \int_{t_0}^{t_{end}} I_{out}\, dt \tag{3}$$

The battery capacity is calculated as the integral of the battery current over the discharge process:

$$C_b = \int_{t_0}^{t_{end}} I_b\, dt \tag{4}$$

Assuming that the battery delivers all of its rated energy and rated capacity during discharge, thus:

$$E_{out} = V_{out} \cdot \int_{t_0}^{t_{end}} I_{out}\, dt = E_b = V_{b\_rated} C_{b\_rated} \tag{5}$$

where the constant output voltage can be taken out of the integration because it is constant at 5 V for the Belkin power bank.

$$V_{out} C_{out} = V_{b\_rated} C_{b\_rated} \tag{6}$$

$$C_{out} = \frac{V_{b\_rated} C_{b\_rated}}{V_{out}} = \frac{3.7\ \text{V} * C_{b\_rated}}{5\ \text{V}} = 74\% * C_{b\_rated} \tag{7}$$

where is the output capacity of the product.

46. The Belkin power bank is advertised to have a capacity of 10000 mAh. However, based on equation 7, the maximum output capacity of the power bank will be 74% of the battery cell capacity, and less than this if one considers energy losses due to the energy consumption in the circuitry of the power bank. This loss in the output capacity is caused by stepping up the battery voltage from 3.7 V to 5 V.

Review of the Construction of the Belkin Power Bank

47. To non-destructively assess what is inside the power bank, an X-ray analysis of the power bank (see Figure 7) was conducted. The X-ray images show that the power bank consists of a single pouch cell connected to the power bank circuitry.

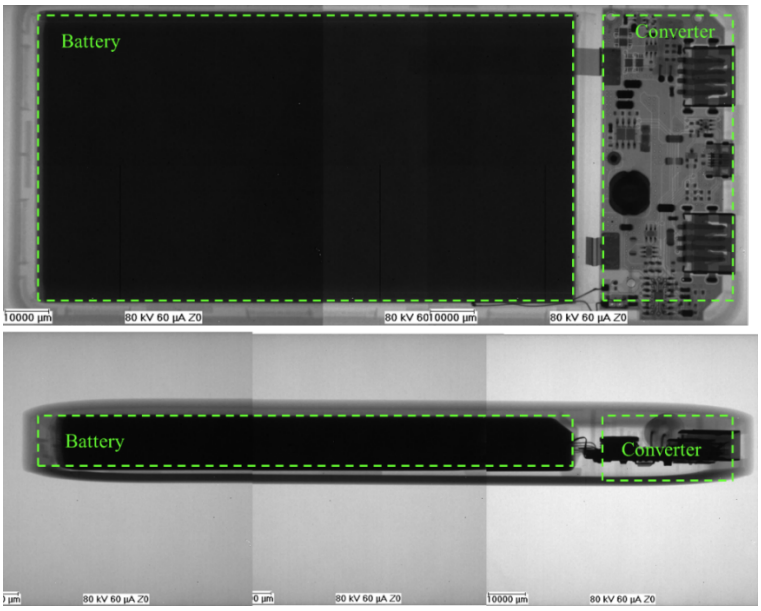

FIGURE 7. X-ray Images of the Belkin power bank

48. The power bank was then opened to investigate internal construction (see Figure 8). Figure 9 is a photo of the pouch cell[11] inside the power bank. A barcode can be observed along with the wording "+ HL X 3.7 V "above the barcode and the wording "SP 1166110 D1 HCK" below the barcode.

FIGURE 8. Photo of an opened Belkin power bank

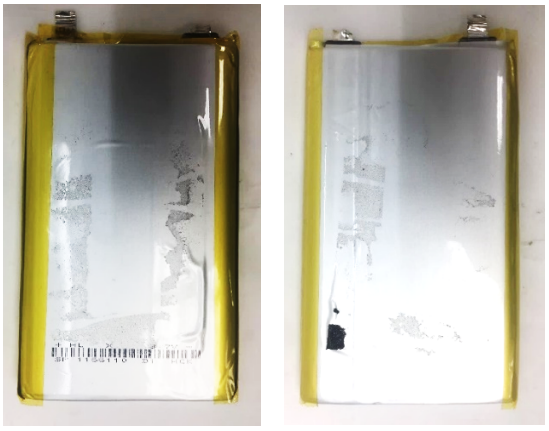

FIGURE 9. Photo of the pouch cell

[11] The pouch cell, often referred to as lithium polymer cells, is one of several lithium-ion battery cell formats (cylindrical, prismatic, coin, etc.) The pouch cell is available in a wide range of sizes and capacities.

Capacity Test of the Belkin Power Bank

49. To assess the accuracy of the advertised capacity, the Belkin power bank was charged in accordance with the Belkin instruction manual, using the Micro-USB cable[12] Belkin provided with the product (plugged into a USB port) until all 4 LED lights were on and stopped flashing (see Figure 10). An Arbin battery tester was then used to discharge the Belkin power bank (see Figure 11) at a current of 2.4 A (which is the output current specified on the package and power bank case) per UL Standard 2056 (UL Standard 2056: "The power bank is discharged at a constant current equal to rated current of the output port, until its voltage is equal to the end-of-discharge voltage of the output port, specified by the manufacturer"). The actual output current of the Belkin power bank depends on the portable device being charged, but the Belkin power bank will limit the output current to 2.4 A maximum. During the discharge process, the output current, voltage, accumulated capacity, and energy were recorded by the Arbin battery tester. Two brand new Belkin power banks were each tested twice. The tests were conducted at a temperature of 23 ± 3 ℃.

FIGURE 10. LED indicators of the Belkin power bank

[12] The micro-USB cable recharges the power bank at 5 V, 2 A.

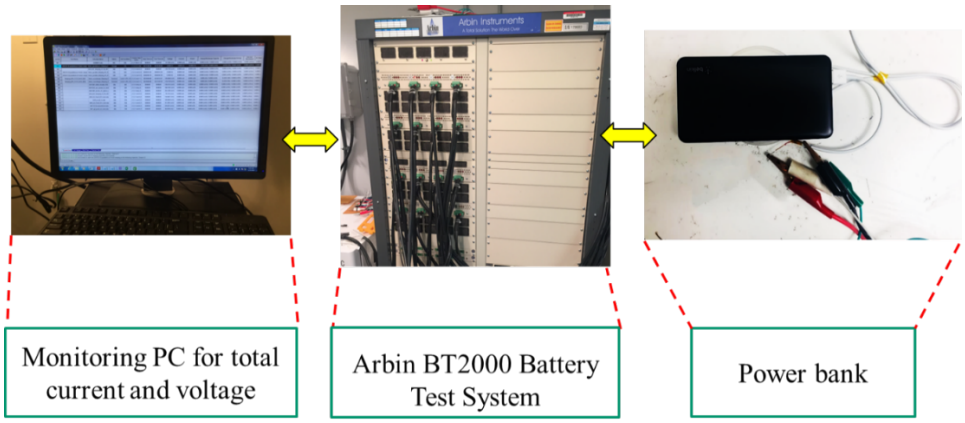

FIGURE 11. Test setup to measure the output capacity of the Belkin power bank

50. After approximately 2.6 hours of discharge, the circuity in the Belkin power bank prevented the Arbin battery tester from draining any additional current from the power bank. This was because the terminal voltage of the battery cell inside the power bank reached the cut-off voltage (a value pre-determined by Belkin).

51. The experimental results show that the actual output capacity of one Belkin power bank was 6342 and 6367 mAh in the two tests, and the other was 6171 and 6177 mAh in the two tests, and the total average was 62.6% of the advertised capacity of the Belkin bank.

52. These results are similar to those determined by Belkin's independent testing lab, Intertek, which determined a "rated capacity" of 6070 mAh. [BELKIN_000373.]

Responses to Defendant's Previous Arguments

53. Previously, the Defendant wrote a memorandum titled "MEMORANDUM OF POINTS AND AUTHORITIES IN SUPPORT OF ITS MOTION FOR SUMMARY JUDGMENT OR, IN THE ALTERNATIVE, FOR SUMMARY JUDGMENT AND FOR A DETERMINATION UNDER CIVIL CODE § 1781(c)(3) THAT THE FOURTH CAUSE OF

ACTION HAS NO MERIT" ("Def. SJ Memo.") In this document, the Defendant made many incorrect statements that show a misunderstanding on how power banks and battery parameters are specified.

54. First, Defendant claimed that "mAh refers to the capacity of the power bank, *i.e.,* the amount of power it can store." *Id.* at 9. And also, Defendant states that "The amount of power that a power bank can store is referred to as 'mAh' which stands for milliampere hours. UMF 7, 15, 23, 31." *Id.* at 8. However, this is not correct. The capacity is the maximum amount of mAh output, not the amount of "power" that can be stored. The unit mAh is the output current integrated over time [17][18]. The output power (mA·V) integrated over time is energy (mAh·V) [19][20].

55. When a capacity value is given on a power bank, this capacity value refers to the capacity that will be **delivered** by the power bank at the specified output current of the power bank; it is not a theoretical and unattainable value. Again, UL Standard 2056 states how to properly specify the capacity. In fact, when a battery company manufactures a battery, it checks (measures) this capacity value to ensure that the value given on the battery will be met (e.g. can be "delivered"). Testing is needed to confirm the capacity and it would not be a reasonable manufacturing practice to simply report a capacity without testing. Furthermore, the capacity is not a value for a battery that would be discharged to any unsafe value of voltage (whether it be the high or low cutoff voltage). I have visited and audited many of the major battery companies and this is standard practice. It is also listed in ANSI C18.2M, Part 1-2007, titled "for Portable Rechargeable Cells and Batteries—General and Specifications", where it states that "1.3.10 capacity, rated (C5): The capacity that is declared by the manufacturer as the minimum to be expected in accordance with 1.4.6.1." and in ISO 12405, titled "Electrically propelled road

vehicles — Test specification for lithium-ion traction battery packs and systems — Part 4: Performance testing", where it states "3.16 rated capacity: supplier's specification of the total number of ampere hours that can be withdrawn from a fully charged battery pack or system for a specified set of test conditions such as discharge rate, temperature and discharge cut-off voltage."

56. Defendants claim that, "In practice, only a fraction of the theoretical energy of the battery is realized. The reference to 'mAh' on the package of any power bank does not mean the amount of power that is available to charge devices" and that "Manufacturers of consumer products using lithium-ion batteries are prohibited by law from selling a device that would deliver the full amount of power it stores." Def. SJ Memo. at 9. This is another set of misleading statements, since the Defendants appear to consider energy and power to be synonymous, and equal to capacity, (the metric stated on the package) [see Figure 2]. But regardless, the Defendant's statements are not correct. UL[13] Standard 2056, titled "Outline of Investigation for Safety of Power Banks" states that: "The marked electrical capacity of power bank, measured at the power output pin of output port, shall comply with the Standard for Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Secondary Lithium Cells and Batteries for Portable Applications, IEC 61960, Clause 7.3.1, Discharge Performance at 20 °C (Rated Capacity), and the modified test method in 12.2. The power bank is discharged at a constant current equal to rated current of the output port, until its voltage is equal to the end-of-discharge voltage of the output port, specified by the manufacturer." In other words, the

[13] UL (Underwriters Laboratories) is an accredited standards developer in the US and Canada. In the US, UL is accredited by the American National Standards Institute (ANSI) as an audited designator. In 2013, UL was accredited by the Standards Council of Canada (SCC) as a nationally recognized Standards Development Organization (SDO) able to develop National Standards of Canada (NSCs) [21].

specified power bank capacity (what is printed on the label) is not a theoretical battery capacity, but instead the actual (deliverable and safe) output capacity measured at the output port of the power bank.

57. UL Standard 2056 for power banks, states that "The following electrical rating shall be permanently and legibly marked on the power bank:" noting "Electrical capacity in Ah or mAh of the power bank. A capacity rating shall additionally be specified for each port if it is not equal to the rating of the power bank." This value reflects the deliverable capacity and not that of the cell.

58. The capacity listed on a product should be a deliverable value, not a theoretical value per UL Standard 2056. A theoretical capacity value that can never be realized, or would provide unsafe results, is not useful information to customers. In fact, customers would likely anticipate the capacity value printed on the package to be a guaranteed minimum.

59. I noted that in Norton's deposition, he stated that on the engineering side, they don't get concerned on how the package is labeled. [pp67:21-24]

60. Defendant has claimed that, "Lithium ion batteries can become unstable in a number of scenarios, including if they are entirely discharged of the power they hold. When your battery stops powering your phone, it doesn't mean it's actually empty. It's not! Lithium-ion batteries only discharge most of the way, mainly because when they discharge all the way they can get wildly unstable." Def. SJ Memo. at 9-10. Defendant again fails to account for battery standards. All reliable and safe electronic products that use batteries have a battery management system (BMS) that ensures that a battery is neither overcharged or over discharged. There are thus limits given by cut-off voltages to ensure this, and these cut-off voltages are always used to determine the capacity (the rated capacity given on the battery). The rated capacity is defined by

IEC 482-03-15 [17] as the "capacity value of a battery determined under specified conditions and declared by the manufacturer." This means that a battery should deliver the rated (advertised) capacity at the specified testing condition at the beginning of life without any safety or instability issues. Thus, by following the standards, such as IEC 482-03-15 [17], there is no issue of selling a device that would be unsafe using the rated capacity of a battery.

61. Defendant cited exhibits for the propositions that: "If a battery comes close to that danger zone, a protection circuit in the battery will trip and kill the battery forever and for real, functionally destroying the battery before it can discharge to a level where it's in danger of exploding." and that "deep or forced discharge under earlier design could result in, among other things, rupture and fires"). Def. SJ Memo. at 9-10. Defendant further stated, "Thus, power banks must be designed to shut off automatically before that happens. . . . As a result of this low-voltage cut off, the entire mAh is not used." *Id*. at 10. Defendant also claimed documents stood for the propositions that "battery is not discharged to zero volts and all of the available ampere-hour capacity is not utilized"; and that "lithium ion batteries use only a percentage of the total energy in order to manage low-end voltage." *Id*.

62. As noted above, all safe products have a battery management system (BMS). Incorporated in the BMS should be protection circuitry that will cut off the operation of the battery when the battery voltage goes beyond the specified operating voltage range, for which the capacity was specified. Within the specified operating voltage range, the battery should deliver the rated capacity (e.g., 10000 mAh). Furthermore, if the power bank manufacturer does not intend to use the battery to its full rated capacity, the actual value or percentage of the battery rated capacity that is useful should be specified.

Substantially Similar Products

63. Belkin argues that the various Belkin power banks have different ports (USB-A, USB-C, Lightning, etc.). In addition, Norton mentioned differences in the various Belkin power banks in his deposition including power banks having different circuity, different capacities, and some power banks being able to feature wireless or magnetic charging. However, even with these differences, all Belkin power banks are substantially similar in how the battery operates within the power bank, in that they all are incapable of delivering the amount of mAh listed on the packaging.

64. Given that the label on the power banks represents the capacity of the battery (cell) inside the power banks, regardless of the different ports, these power bank models will not deliver the amount of mAh represented on the label. In fact, Jack Norton stated that there will be capacity losses through all products unless its directly connected to the cell itself. *See* Transcript of Deposition of Jack Norton at pp. 10-11.

Closing Statements

65. Consumers are not battery experts, but are also not unintelligent. They do consider the capacity listed on the power bank for guidance in the selection of a power bank; indeed, it is the only objective measure of a power bank's capacity available to consumers at the time of purchase.

66. For the Belkin power bank, the advertised capacity on the front of the packaging is 10000 mAh. However, this advertised capacity is not the capacity that a consumer will get delivered to their device, whether it be a smartphone, a computer, or another device. Based on experimental results, less than 64% of the advertised capacity can be delivered to charge an external device. As noted above, if a consumer used the Belkin power bank for an electronic

device that needs a capacity of, for example, 2500 mAh at 5 V, they might think that they can charge their device four times, where in fact, they would even not be able to fully charge it three times.

67. The misleading Belkin package labeling can have severe and unsafe consequences for a consumer of the power bank, who may need their portable devices to operate, for example, during activities like hiking, driving, international travel, or other situations where there is no facility to charge a phone or laptop.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on December 13, 2023 in Hong Kong, China.

MICHAEL G. PECHT

REFERENCES

[1] Outline of Investigation for Safety of Power Banks, UL Standard 2056, 2015.

[2] Suen, C. Y. B., K. T. Chan, T. K. Hung, and C. C. Lee. "Remote monitoring on capacity of portable power bank in testing laboratories." In IECON 2017-43rd Annual Conference of the IEEE Industrial Electronics Society, pp. 4734-4739. IEEE, 2017.

[3] Diao, W., Saxena, S., and Pecht, M. G. (2020). Analysis of Specified Capacity in Power Banks. IEEE Access, 8, 21326-21332.

[4] Wang, Y., Tian, J., Sun, Z., Wang, L., Xu, R., Li, M., & Chen, Z. (2020). A comprehensive review of battery modeling and state estimation approaches for advanced battery management systems. Renewable and Sustainable Energy Reviews, 131, 110015.

[5] American National Standard for Portable Rechargeable cells and Batteries - General and Specifications, Part 1-2019.

[6] ISO, B. (2018). 12405-4: 2018, electrically propelled road vehicles–test specification for lithium-ion traction battery packs and systems; part 4: Performance testing". British Standards Institution.

[7] https://blog.banggood.com/the-secret-marketing-trick-behind-powerbank-capacity-29982.html

[8] http://www.dianelesliemarketing.com/files/PowerBank_CERTIFICATIONS.pdf

[9] http://www.arrl.org/part-15-radio-frequency-devices

[10] https://www.nts.com/services/certification/ce-marking/

[11] https://www.sgs.com/en/news/2017/03/south-korea-kc-certification-for-electrical-and-electronic-products

[12] https://www.engalservices.com/en/newsroom/download-eac-label-mark-russia

[13] https://nvlpubs.nist.gov/nistpubs/ir/2017/NIST.IR.8118r1.pdf

[14] https://www.lightingcouncil.com.au/wp-content/uploads/2018/05/Regulatory-Compliance-marking.pdf

[15] https://www.consumerreports.org/smartphones/symbols-on-smartphone-charger/

[16] IEEE, "Standard for Rechargeable Batteries for Multi-Cell Mobile Computing Devices", IEEE 1625-2008.

[17] International Electrotechnical Commission (IEC) Vocabulary. http://www.electropedia.org/iev/iev.nsf/display?openform&ievref=121-11-13

[18] International Electrotechnical Commission (IEC) Vocabulary. http://www.electropedia.org/iev/iev.nsf/display?openform&ievref=113-02-10

[19] International Electrotechnical Commission (IEC) Vocabulary. http://www.electropedia.org/iev/iev.nsf/display?openform&ievref=113-03-45

[20] International Electrotechnical Commission (IEC) Vocabulary. http://www.electropedia.org/iev/iev.nsf/display?openform&ievref=113-03-52

[21] UL standards. https://ulstandards.ul.com/

APPENDIX 1

- N. Williard, C. Hendricks, J. Chung and M. Pecht, "Effects of External Pressure on Phase Stability and Diffusion Rate in Lithium-Ion Cells,". Journal of Electroanalytical Chemistry, p. 115400, 2021, DOI: 10.1016/j.jelechem.2021.115400.
- N. Lingappan, L. Kong and M. G. Pecht, "The Significance of Aqueous Binders in Lithium-Ion Batteries". Renewable and Sustainable Energy Reviews, vol. 147, p. 111227, 2021, DOI: 10.1016/j.rser.2021.111227.
- Roman, D., Saxena, S., Robu, V., Pecht, M., Flynn, D. "Machine learning pipeline for battery state-of-health estimation". Nature Machine Intelligence, 1-10, 2021.
- H. Ali, H. A. Khan and M. G. Pecht, "Circular Economy of Li Batteries: Technologies and Trends". Journal of Energy Storage, vol. 40, p. 102690, 2021, DOI: 10.1016/j.est.2021.102690.
- B. Xu, L. Kong, G. Wen and M. G. Pecht, "Protection Devices in Commercial 18650 Lithium-Ion Batteries". IEEE Access, vol. 9, pp. 66687-66695, April 2021, DOI: 10.1109/ACCESS.2021.3075972.
- Y. Wang, J. Li, J. Zhang and M. G. Pecht, "Lithium-iron-phosphate Battery Electrochemical Modelling Under a Wide Range of Ambient Temperatures". Journal of Electroanalytical Chemistry, vol. 882, p. 115041, February 2021, DOI: 10.1016/j.jelechem.2021.115041.
- S. Saxena, Y. Ning, R. Thompson and M. G. Pecht, "Role of the Rest Period in Capacity Fade of Graphite/$LiCoO_2$ Batteries". Journal of Power Sources, vol. 484, p. 229246, February 2021, DOI: 10.1016/j.jpowsour.2020.229246.

- W. Diao, B. Xu and M. G. Pecht, "Charging Induced Electrode Layer Fracturing of 18650 Lithium-ion Batteries". Journal of Power Sources, vol. 484, p. 229260, February 2021, DOI: 10.1016/j.jpowsour.2020.229260.
- S. Saxena, D. Roman, V. Robu, D. Flynn and M. G. Pecht, "Battery Stress Factor Ranking for Accelerated Degradation Test Planning Using Machine Learning". Energies, vol. 14, no. 3, p. 723, January 2021, DOI: 10.3390/en14030723.
- Y. Che, A. Foley, M. El-Gindy, X. Lin, X. Hu and M. G. Pecht, "Joint Estimation of Inconsistency and State of Health for Series Battery Packs". Automotive Innovation, January 2021, DOI: 10.1007/s42154-020-00128-8.
- Saxena, S.; Roman, D.; Robu, V.; Flynn, D.; Pecht, M., "Battery Stress Factor Ranking for Accelerated Degradation Test Planning Using Machine Learning". *Energies 14*, 723, 2021. https://doi.org/10.3390/en14030723.
- W. Diao, I. H. Naqvi, and M. Pecht, "Early detection of anomalous degradation behavior in lithium-ion batteries," J. Energy Storage, vol. 32, p. 101710, Dec. 2020.
- L. Kong, X. Hu, G. Gui, Y. Su, and M. Pecht, "Computed Tomography Analysis of Li-Ion Battery Case Ruptures," Fire Technol., vol. 56, no. 6, pp. 2565–2578, Nov. 2020.
- Wang, S., Han, W., Chen, L., Zhang, X., Pecht, M. "Experimental verification of lithium-ion battery prognostics based on an interacting multiple model particle filter". Transactions of the Institute of Measurement and Control, 0142331220961576.
- H. Dai, B. Jiang, X. Hu, X. Lin, X. Wei, and M. Pecht, "Advanced battery management strategies for a sustainable energy future: Multilayer design concepts and research trends," Renewable and Sustainable Energy Reviews. Elsevier Ltd, p. 110480, 29-Oct-2020.

- J. Li et al., "Aging modes analysis and physical parameter identification based on a simplified electrochemical model for lithium-ion batteries," J. Energy Storage, vol. 31, p. 101538, Oct. 2020.
- S. Saxena and M. Pecht, "X-ray based non-destructive method for alkaline coin cell quality assurance," J. Energy Storage, vol. 30, p. 101476, Aug. 2020.
- H. Liu et al., "An analytical model for the CC-CV charge of Li-ion batteries with application to degradation analysis," J. Energy Storage, vol. 29, p. 101342, Jun. 2020.
- X. Y. Yao, L. Kong, and M. G. Pecht, "Reliability of Cylindrical Li-ion Battery Safety Vents," IEEE Access, vol. 8, pp. 101859–101866, May. 2020.
- H. Ali, H. A. Khan, and M. G. Pecht, "Evaluation of Li-Based Battery Current, Voltage, and Temperature Profiles for In-Service Mobile Phones," IEEE Access, vol. 8, pp. 73665–73676, Apr. 2020.
- X. Hu, Y. Zheng, D. A. Howey, H. Perez, A. Foley, and M. Pecht, "Battery warm-up methodologies at subzero temperatures for automotive applications: Recent advances and perspectives," Progress in Energy and Combustion Science, vol. 77. Elsevier Ltd, p. 100806, 01-Mar-2020.
- Y. Zhou, M. Huang, and M. Pecht, "Remaining useful life estimation of lithium-ion cells based on k-nearest neighbor regression with differential evolution optimization," J. Clean. Prod., vol. 249, Mar. 2020.
- X. Hu, L. Xu, X. Lin, M. Pecht, "Battery Lifetime Prognostics," Joule, Vol. 4, pp. 310-346, Feb. 2020.
- C. Lee, S. Jo, D. Kwon, and M. Pecht, "Capacity-fading Behavior Analysis for Early Detection of Unhealthy Li-ion Batteries," IEEE Trans. Ind. Electron., pp. 1–1, Feb. 2020.

- C. E. Hendricks, A. N. Mansour, D. A. Fuentevilla, G. H. Waller, J. K. Ko, and M. G. Pecht, "Copper Dissolution in Overdischarged Lithium-ion Cells: X-ray Photoelectron Spectroscopy and X-ray Absorption Fine Structure Analysis," J. Electrochem. Soc., vol. 167, no. 9, p. 090501, Jan. 2020.
- W. Diao, S. Saxena, and M. G. Pecht, "Analysis of Specified Capacity in Power Banks," IEEE Access, vol. 8, pp. 21326–21332, Jan. 2020.
- R. Aalund and M. Pecht, "The Use of UL 1642 Impact Testing for Li-ion Pouch Cells," IEEE Access, vol. 7, pp. 176706–176711, Dec. 2019.
- Y. Zhang, R. Xiong, H. He, X. Qu, and M. Pecht, "State of charge-dependent aging mechanisms in graphite/Li(NiCoAl)O2 cells: Capacity loss modeling and remaining useful life prediction," Appl. Energy, vol. 255, p. 113818, Dec. 2019.
- J. Li, L. Wang, C. Lyu, D. Wang, and M. Pecht, "Parameter updating method of a simplified first principles-thermal coupling model for lithium-ion batteries," Appl. Energy, vol. 256, p. 113924, Dec. 2019.
- Q. Yu, R. Xiong, R. Yang, and M. G. Pecht, "Online capacity estimation for lithium-ion batteries through joint estimation method," Appl. Energy, vol. 255, p. 113817, Dec. 2019.
- C. Lyu, J. Li, L. Zhang, L. Wang, D. Wang, and M. Pecht, "State of charge estimation based on a thermal coupling simplified first-principles model for lithium-ion batteries," J. Energy Storage, vol. 25, p. 100838, Oct. 2019.
- J. Li, D. Wang, and M. Pecht, "An electrochemical model for high C-rate conditions in lithium-ion batteries," J. Power Sources, vol. 436, p. 226885, Oct. 2019.

- W. Diao, S. Saxena, and M. Pecht, "Accelerated cycle life testing and capacity degradation modeling of LiCoO2-graphite cells," J. Power Sources, vol. 435, p. 226830, Sep. 2019.
- J. Lee, D. Kwon, and M. G. Pecht, "Reduction of Li-ion Battery Qualification Time Based on Prognostics and Health Management," IEEE Trans. Ind. Electron., vol. 66, no. 9, pp. 7310–7315, Sep. 2019.
- W. Diao, M. Pecht, and T. Liu, "Management of imbalances in parallel-connected lithium-ion battery packs," J. Energy Storage, vol. 24, p. 100781, Aug. 2019.
- Y. Zhang, R. Xiong, H. He, X. Qu, and M. Pecht, "Aging characteristics-based health diagnosis and remaining useful life prognostics for lithium-ion batteries," eTransportation, vol. 1, p. 100004, Aug. 2019.
- W. Diao, S. Saxena, B. Han, and M. Pecht, "Algorithm to Determine the Knee Point on Capacity Fade Curves of Lithium-Ion Cells," Energies, vol. 12, no. 15, p. 2910, Jul. 2019.
- Y. Wu, Y. Wang, W. K. C. Yung, and M. Pecht, "Ultrasonic Health Monitoring of Lithium-Ion Batteries," Electronics, vol. 8, no. 7, p. 751, Jul. 2019.
- S. Saxena, Y. Xing, D. Kwon, and M. Pecht, "Accelerated degradation model for C-rate loading of lithium-ion batteries," Int. J. Electr. Power Energy Syst., vol. 107, pp. 438–445, May 2019.
- R. Xiong, Y. Zhang, J. Wang, H. He, S. Peng, and M. Pecht, "Lithium-Ion Battery Health Prognosis Based on a Real Battery Management System Used in Electric Vehicles," IEEE Trans. Veh. Technol., vol. 68, no. 5, pp. 4110–4121, May 2019.
- Y. Sun, L. Kong, H. Abbas Khan, and M. G. Pecht, "Li-ion Battery Reliability - A Case Study of the Apple iPhone®," IEEE Access, vol. 7, pp. 71131–71141, May 2019.

- X. Y. Yao, S. Saxena, L. Su, and M. G. Pecht, "The Explosive Nature of Tab Burrs in Li-Ion Batteries," IEEE Access, vol. 7, pp. 45978–45982, Apr. 2019.
- Y. Z. Zhang, R. Xiong, H. W. He, and M. Pecht, "Validation and verification of a hybrid method for remaining useful life prediction of lithium-ion batteries," J. Clean. Prod., vol. 212, pp. 240–249, Mar. 2019.
- Y. Zhang, R. Xiong, H. He, and M. G. Pecht, "Lithium-Ion Battery Remaining Useful Life Prediction with Box-Cox Transformation and Monte Carlo Simulation," IEEE Trans. Ind. Electron., vol. 66, no. 2, pp. 1585–1597, Feb. 2019.
- X. Y. Yao and M. G. Pecht, "Tab design and failures in cylindrical li-ion batteries," IEEE Access, vol. 7, pp. 24082–24095, Feb. 2019.
- Y. Sun, S. Saxena, and M. Pecht, "Derating Guidelines for Lithium-Ion Batteries," Energies, vol. 11, no. 12, p. 3295, Nov. 2018.
- N. Patel, S. Bishop, R. Utter, D. Das, and M. Pecht, "Failure Modes, Mechanisms, Effects, and Criticality Analysis of Ceramic Anodes of Solid Oxide Fuel Cells," Electronics, vol. 7, no. 11, p. 323, Nov. 2018.
- W. Diao, Y. Xing, S. Saxena, and M. Pecht, "Evaluation of Present Accelerated Temperature Testing and Modeling of Batteries," Appl. Sci., vol. 8, no. 10, p. 1786, Oct. 2018.
- Y. Sun, X. Hao, M. Pecht, and Y. Zhou, "Remaining useful life prediction for lithium-ion batteries based on an integrated health indicator," Microelectron. Reliab., vol. 88–90, pp. 1189–1194, Sep. 2018.
- L. Kong, C. Li, J. Jiang, and M. Pecht, "Li-Ion Battery Fire Hazards and Safety Strategies," Energies, vol. 11, no. 9, p. 2191, Aug. 2018.

- W. He, M. Pecht, D. Flynn, and F. Dinmohammadi, "A Physics-Based Electrochemical Model for Lithium-Ion Battery State-of-Charge Estimation Solved by an Optimised Projection-Based Method and Moving-Window Filtering," Energies, vol. 11, no. 8, p. 2120, Aug. 2018.
- S. Peng, X. Zhu, Y. Xing, H. Shi, X. Cai, and M. Pecht, "An adaptive state of charge estimation approach for lithium-ion series-connected battery system," J. Power Sources, vol. 392, pp. 48–59, Jul. 2018.
- M. Pecht, "When e-cigarettes go boom," IEEE Spectr., vol. 55, no. 7, pp. 43–45, Jul. 2018.
- Y. Zhang, R. Xiong, H. He, and M. G. Pecht, "Long short-term memory recurrent neural network for remaining useful life prediction of lithium-ion batteries," IEEE Trans. Veh. Technol., vol. 67, no. 7, pp. 5695–5705, Jul. 2018.
- C. Zou, L. Zhang, X. Hu, Z. Wang, T. Wik, and M. Pecht, "A review of fractional-order techniques applied to lithium-ion batteries, lead-acid batteries, and supercapacitors," Journal of Power Sources, vol. 390. Elsevier B.V., pp. 286–296, 30-Jun-2018.
- J. Li, L. Wang, C. Lyu, E. Liu, Y. Xing, and M. Pecht, "A parameter estimation method for a simplified electrochemical model for Li-ion batteries," Electrochim. Acta, vol. 275, pp. 50–58, Jun. 2018.
- Y. Wu et al., "Analysis of Manufacturing-Induced Defects and Structural Deformations in Lithium-Ion Batteries Using Computed Tomography," Energies, vol. 11, no. 4, p. 925, Apr. 2018.
- S. Saxena, Y. Xing, and M. Pecht, "A Unique Failure Mechanism in the Nexus 6P Lithium-Ion Battery," Energies, vol. 11, no. 4, p. 841, Apr. 2018.

- S. Saxena, L. Kong, and M. G. Pecht, "Exploding E-Cigarettes: A Battery Safety Issue," IEEE Access, vol. 6, pp. 21442–21466, Mar. 2018.
- L. Kong, Y. Xing, and M. G. Pecht, "In-Situ Observations of Lithium Dendrite Growth," IEEE Access, vol. 6, pp. 8387–8393, Feb. 2018.
- W. Diao, N. Xue, V. Bhattacharjee, J. Jiang, O. Karabasoglu, and M. Pecht, "Active battery cell equalization based on residual available energy maximization," Appl. Energy, vol. 210, pp. 690–698, Jan. 2018.
- Z. X. Zhang, X. S. Si, C. H. Hu, and M. G. Pecht, "A prognostic model for stochastic degrading systems with state recovery: Application to Li-ion batteries," IEEE Trans. Reliab., vol. 66, no. 4, pp. 1293–1308, Dec. 2017.
- X. Su, S. Wang, M. Pecht, P. Ma, and L. Zhao, "Prognostics of lithium-ion batteries based on different dimensional state equations in the particle filtering method," Trans. Inst. Meas. Control, vol. 39, no. 10, pp. 1537–1546, Oct. 2017.
- J. Li, L. Wang, C. Lyu, and M. Pecht, "State of charge estimation based on a simplified electrochemical model for a single LiCoO2 battery and battery pack," Energy, vol. 133, pp. 572–583, Aug. 2017.
- R. Xiong, Y. Zhang, H. He, X. Zhou, and M. G. Pecht, "A double-scale, particle-filtering, energy state prediction algorithm for lithium-ion batteries," IEEE Trans. Ind. Electron., vol. 65, no. 2, pp. 1526–1538, Jul. 2017.
- A. Fortier, M. Tsao, N. Williard, Y. Xing, and M. Pecht, "Preliminary Study on Integration of Fiber Optic Bragg Grating Sensors in Li-Ion Batteries and In Situ Strain and Temperature Monitoring of Battery Cells," Energies, vol. 10, no. 7, p. 838, Jun. 2017.

- H. Huo, Y. Xing, M. Pecht, B. J. Züger, N. Khare, and A. Vezzini, "Safety Requirements for Transportation of Lithium Batteries," Energies, vol. 10, no. 6, p. 793, Jun. 2017.
- S. Saxena, G. Sanchez, and M. Pecht, "Batteries in Portable Electronic Devices: A User's Perspective," IEEE Industrial Electronics Magazine, vol. 11, no. 2. Institute of Electrical and Electronics Engineers Inc., pp. 35–44, 01-Jun-2017.
- X. Cheng and M. Pecht, "In Situ Stress Measurement Techniques on Li-ion Battery Electrodes: A Review," Energies, vol. 10, no. 5, p. 591, Apr. 2017.
- S.-C. Huang, K.-H. Tseng, J.-W. Liang, C.-L. Chang, and M. Pecht, "An Online SOC and SOH Estimation Model for Lithium-Ion Batteries," Energies, vol. 10, no. 4, p. 512, Apr. 2017.
- X. ming Cheng, L. guang Yao, and M. Pecht, "Lithium-ion battery state-of-charge estimation based on deconstructed equivalent circuit at different open-circuit voltage relaxation times," J. Zhejiang Univ. Sci. A, vol. 18, no. 4, pp. 256–267, Apr. 2017.
- X. Su, S. Wang, M. Pecht, L. Zhao, and Z. Ye, "Interacting multiple model particle filter for prognostics of lithium-ion batteries," Microelectron. Reliab., vol. 70, pp. 59–69, Mar. 2017.
- E. Cripps and M. Pecht, "A Bayesian nonlinear random effects model for identification of defective batteries from lot samples," J. Power Sources, vol. 342, pp. 342–350, Feb. 2017.
- Z. Liu, G. Sun, S. Bu, J. Han, X. Tang, and M. Pecht, "Particle Learning Framework for Estimating the Remaining Useful Life of Lithium-Ion Batteries," IEEE Trans. Instrum. Meas., vol. 66, no. 2, pp. 280–293, Feb. 2017.

- F. Zheng, Y. Xing, J. Jiang, B. Sun, J. Kim, and M. Pecht, "Influence of different open circuit voltage tests on state of charge online estimation for lithium-ion batteries," Appl. Energy, vol. 183, pp. 513–525, Dec. 2016.
- F. Zheng, J. Jiang, B. Sun, W. Zhang, and M. Pecht, "Temperature dependent power capability estimation of lithium-ion batteries for hybrid electric vehicles," Energy, vol. 113, pp. 64–75, Oct. 2016.
- S. Saxena, C. Hendricks, and M. Pecht, "Cycle life testing and modeling of graphite/LiCoO2 cells under different state of charge ranges," J. Power Sources, vol. 327, pp. 394–400, Sep. 2016.
- X. Cheng, L. Yao, Y. Xing, and M. Pecht, "Novel Parametric Circuit Modeling for Li-Ion Batteries," Energies, vol. 9, no. 7, p. 539, Jul. 2016.
- N. Williard, C. Hendricks, B. Sood, J. Chung, and M. Pecht, "Evaluation of Batteries for Safe Air Transport," Energies, vol. 9, no. 5, p. 340, May 2016.
- C. Hendricks, N. Williard, S. Mathew, and M. Pecht, "A failure modes, mechanisms, and effects analysis (FMMEA) of lithium-ion batteries," Journal of Power Sources, vol. 297. Elsevier B.V., pp. 113–120, 11-Aug-2015.
- F. Leng, C. M. Tan, and M. Pecht, "Effect of Temperature on the Aging rate of Li Ion Battery Operating above Room Temperature," Sci. Rep., vol. 5, no. 1, p. 12967, Aug. 2015.
- J. Guo, Z. Li, and M. Pecht, "A Bayesian approach for Li-Ion battery capacity fade modeling and cycles to failure prognostics," J. Power Sources, vol. 281, pp. 173–184, May 2015.

- G. Bai, P. Wang, C. Hu, and M. Pecht, "A generic model-free approach for lithium-ion battery health management," Appl. Energy, vol. 135, pp. 247–260, Dec. 2014.
- D. Liu, Y. Luo, J. Liu, Y. Peng, L. Guo, and M. Pecht, "Lithium-ion battery remaining useful life estimation based on fusion nonlinear degradation AR model and RPF algorithm," Neural Comput. Appl., vol. 25, no. 3–4, pp. 557–572, Dec. 2014.
- W. He, N. Williard, C. Chen, and M. Pecht, "State of charge estimation for Li-ion batteries using neural network modeling and unscented Kalman filter-based error cancellation," Int. J. Electr. Power Energy Syst., vol. 62, pp. 783–791, Nov. 2014.
- Y. Xing, W. He, M. Pecht, and K. L. Tsui, "State of charge estimation of lithium-ion batteries using the open-circuit voltage at various ambient temperatures," Appl. Energy, vol. 113, pp. 106–115, Jan. 2014.
- N. Williard, W. He, C. Hendricks, and M. Pecht, "Lessons Learned from the 787 Dreamliner Issue on Lithium-Ion Battery Reliability," Energies, vol. 6, no. 9, pp. 4682–4695, Sep. 2013.
- Y. Chen, Q. Miao, B. Zheng, S. Wu, and M. Pecht, "Quantitative Analysis of Lithium-Ion Battery Capacity Prediction via Adaptive Bathtub-Shaped Function," Energies, vol. 6, no. 6, pp. 3082–3096, Jun. 2013.
- Q. Miao, L. Xie, H. Cui, W. Liang, and M. Pecht, "Remaining useful life prediction of lithium-ion battery with unscented particle filter technique," Microelectron. Reliab., vol. 53, no. 6, pp. 805–810, Jun. 2013.
- W. He, N. Williard, C. Chen, and M. Pecht, "State of charge estimation for electric vehicle batteries using unscented kalman filtering," Microelectron. Reliab., vol. 53, no. 6, pp. 840–847, Jun. 2013.

- D. Liu, J. Pang, J. Zhou, Y. Peng, and M. Pecht, "Prognostics for state of health estimation of lithium-ion batteries based on combination Gaussian process functional regression," Microelectron. Reliab., vol. 53, no. 6, pp. 832–839, Jun. 2013.
- Y. Xing, E. W. M. Ma, K. L. Tsui, and M. Pecht, "An ensemble model for predicting the remaining useful performance of lithium-ion batteries," Microelectron. Reliab., vol. 53, no. 6, pp. 811–820, Jun. 2013.
- N. Williard, W. He, M. Osterman, and M. Pecht, "Comparative analysis of features for determining state of health in lithium-ion batteries," Int. J. Progn. Heal. Manag., vol. 4, no. 1, Jun. 2013.
- D. Wang, Q. Miao, and M. Pecht, "Prognostics of lithium-ion batteries based on relevance vectors and a conditional three-parameter capacity degradation model," J. Power Sources, vol. 239, pp. 253–264, Oct. 2013.
- W. He, N. Williard, M. Osterman, and M. Pecht, "Prognostics of lithium-ion batteries based on Dempster-Shafer theory and the Bayesian Monte Carlo method," J. Power Sources, vol. 196, no. 23, pp. 10314–10321, Dec. 2011.
- N. Williard, B. Sood, M. Osterman, and M. Pecht, "Disassembly methodology for conducting failure analysis on lithium-ion batteries," Journal of Materials Science: Materials in Electronics, vol. 22, no. 10. Springer, pp. 1616–1630, Oct. 2011.
- Y. Xing, E. W. M. Ma, K. L. Tsui, and M. Pecht, "Battery Management Systems in Electric and Hybrid Vehicles," Energies, vol. 4, no. 11, pp. 1840–1857, Oct. 2011.

EXHIBIT 1

Michael Gerard Pecht

Professional Engineer

EDUCATION

Ph.D. Engineering Mechanics (1982); M.S. Engineering Mechanics (1979); M.S. Electrical Engineering (1978); B.S. Acoustics-Physics (1976); Univ. of Wisconsin, Madison.

EXPERIENCE

Professional Engineer (since 1979): State of Maryland (previously State of Wisconsin)

Faculty: George E. Dieter Chair Professor in Mechanical Engineering (1983–present), Professor of Applied Mathematics, Statistics and Scientific Computation (2008–present), and Professor in Systems Engineering at the University of Maryland (1990–1994). Adjunct Professor in Risk Management at Yokohama National University (2016), Professor of Electrical Engineering at City University of Hong Kong (2008–2010). Visiting Professor in Reliability Engineering at Beihang University—China (2005–2013). Visiting Professor in Physics at Shanghai—JiaoTong University (2004–2007). Managed over 200 programs funded by both government and industry. Developed 12 courses associated with electronics products and systems, and prognostics and systems health management, authored more than 30 books, and graduated over 100 M.S. and 72 Ph.D. students.

Founder and Director: Center for Advanced Life Cycle Engineering (CALCE), having consortia in both Electronic Products and Systems, and Prognostics and Health Management, and supported by over 150 industry and government members, with a budget of over $6 million/yr, and graduating over 30 M.S. and Ph.D. students per year (1985 – 2020).

National Academy of Science/Engineering (NAE/NAS) Committees (invited to participate): Committee for reliability growth; Committee to investigate printed circuit board manufacturing in the U.S.; Committee to examine research needs in materials engineering; Committee to investigate automotive sudden acceleration and reliability (gave presentation but declined to participate).

Expert for Congressional Investigations: Committee on Energy & Commerce to investigate automotive reliability issues: Toyota sudden acceleration (2009–2010); and GM ignition – air bag recalls and NHTSA responses (2014).

FDA Expert: Taught reliability courses and aided FDA in assessing the reliability capability maturity assessment of manufacturers of medical devices, the techniques used to qualify devices, and medical device reliability and safety. (Sept. 2007–Sept. 2008)

Editor in Chief:

- Elsevier e-Prime Journal of Electrical Engineering, Electronics and Energy (2021 – present)
- ASME Open Journal of Engineering: first editor of the journal: (2021 – 2022)
- Life Cycle Reliability and Safety Engineering, Springer (2012 – 2021)
- Circuit World (2019–2020)
- IEEE Access (2012–2018): first editor of the journal; 2015 PROSE Award winner in the subject category of "Journal/Best New STM (Scientific, Technical, and Medical)". Selected for Thomson Reuters Science Citation Index in 2015. (also senior editor from 2020 – 2021)
- International Journal of Performability Engineering (2009–2012)
- Microelectronics Reliability, Elsevier (1996–2012)
- IEEE Transactions on Reliability (1988–1997)

Vice President: PASS Inc., Initiated programs under both U.S. Army and Air Force contracts to determine the storage reliability of electronic equipment and to develop assessment methods for long term storage and dormancy reliability. Resigned as Vice President (1990–1993), but served as a consultant for ERS Inc. until 1998.

Vice President: Ramsearch Inc., Established company and awarded $1.5M to develop a concurrent electrical engineering decision support system. Won contracts to research temperature-dependent IC failures. Was bought out in 1991. (1988–1991)

Scientist: Engineering Research Center, Madison, WI: Worked on reliability assessment of Astro I Space Telescope. (1983)

Civil Service Electronics Technician: High Energy Physics at the University of Wisconsin and at the National Accelerator Laboratory in Batavia, Illinois. Developed electronics instrumentation. (1971–1975)

Selected Research and Organizational Accomplishments

- 2021, $1.5M contract with Polytechnic University of Hong Kong. Center for Artificial Intelligence for Reliability and Safety.

- 2023, 2022, 2021, 2020, 2019, Prof. Pecht has been identified by Clarivate as one of the Highly Cited Researchers for his exceptional research influence, demonstrated by the production of highly cited papers that rank in the top 1% by citations in 2019, 2020, 2021 and 2022, 2023 in Web of Science. Highly Cited Researchers are among those who have demonstrated significant and broad influence reflected in their publication of multiple papers, highly cited by their peers over the course of the last decade. In 2023, there were about 7000 people who had this honour worldwide. At the University of Maryland, there were only three people with this distinction.

- 2017, Chairman for IEEE 1856, "Standard Framework for Prognostics and Health Management (PHM) of Electronic Systems". This standard describes a normative framework for classifying PHM capability and for planning the development of PHM for an electronic system or product.

- 2012, Selected to be the Editor in Chief of the new IEEE Access journal. This journal was awarded the 2015 PROSE Award in the subject category of "Journal/Best New STM (Scientific, Technical, and Medical)." Grew the journal to revenues of over $8M per year by 2018.

- 2010, Established a battery health management and prognostics research program at CALCE, with over $1M funding from NSF, U.S. Navy, and the CALCE members.

- 2008, Initiated prognostics and system's health management research at the City University of Hong Kong and within southern China. Received over US $3M in grant funding from the Hong Kong government.

- 2007, Established the CALCE Prognostics and Health Management Consortium at the University of Maryland. This was the first diagnostics, prognostics, and system health management consortium for electronics in the world.

- 2005, Developed a new paradigm for reliability prediction of electronics based on prognostics, whereby sensor data can be integrated with models that enable in-situ assessment of the deviation or degradation of a product from an expected normal operating condition and the prediction of the future state of reliability. Developed prognostics roadmap for inclusion in the ITRI semiconductor roadmap.

- 2005, Chairman for IEEE Organizational Reliability Capability Standard 1624, which defines the reliability capability of organizations and identifies the criteria for assessing the reliability capability of an organization.

- 2004, Developed the concept of physics-of-failure for electronics reliability and the Failure Modes, Mechanism and Effects Analysis (FMMEA), which became formalized in a series of JEDEC Standards, including: JEDEC-STD-148, titled "Reliability Qualification of Semiconductor Devices Based on Physics of Failure Risk and Opportunity Assessment;" JESD34, titled "Failure-Mechanism-Driven Reliability Qualification of Silicon Devices;" JESD47, titled "Stress-Test Driven Qualification of Integrated Circuits;" and JESD94, titled "Application Specific Qualification Using Knowledge Based Test Methodology."

- 2002, Established electronics prognostics and health monitoring program at CALCE Electronic Products and Systems Center. Developed prognostics and physics-of-failure techniques to prove (under 2 NASA contracts) that the electronics on a NASA space shuttle robot arm and on NASA booster rockets can survive additional missions after the completion of the 2001 designed-for life. This was used to certify future missions.

- 2002, Chairman for IEEE Reliability Prediction Assessment Guidebook #1413.1 (1999–2002).

- 2001, Established $4M lead-free electronics research program at CALCE. This was the only research program to assess the long-term (6 years +) reliability of lead-free devices and products.
- 1999, Established CALCE Electronic Products and Systems Center as the first academic research facility in the world to be ISO 9001 certified.
- 1999, Developed Pecht's Law, which provides an estimate of semiconductor device reliability trends and the requirements for accelerated testing.
- 1998, As IEEE chairperson, led the development of both the IEEE #1332 Reliability Program Standard, and IEEE #1413 Standard Methodology for Reliability Prediction and Assessment for Electronic Systems and Equipment. Received IEEE Standards Award in 2000.
- 1997, Developed the concept of "up-rating", which is the process to assess the capability of semiconductor devices to meet functionality and performance requirements outside the manufacturers' specification. The up-rating approach was institutionalized into IEC/PAS 62240: Use of Semiconductor Devices Outside Manufacturers' Specified Temperature Ranges, Edition 1, 2001; as well as GEIA 4900, 2001, and is currently used for all commercial avionics systems.
- 1996, Led program to develop production-quality design and reliability assessment methods and software used by Texas Instruments, Westinghouse, AlliedSignal, Lockheed, and Rockwell International.
- 1995, Won $4.8M in NSF contracts to enhance the research and educational programs in electronic products and systems development.
- 1995, Modeled IC endurance and assessed the risks of replacing ceramic IC packages with plastic packages for avionics and military applications. The studies (and book "Plastic Encapsulated Microcircuits" John Wiley Publishing), were fundamental to the use of plastic encapsulated microcircuits for the Boeing 777 and for the general use of commercial parts in military and aerospace applications.
- 1995, Formalized the concept of the physics-of-failure of electronic components, a methodology which includes modeling root-cause failure mechanisms and the impact of defects and loads on product reliability.
- 1993, Designed and fabricated an opto-electronics semiconductor package for the automotive industry (with Dr. David Bigio).
- 1992–1994, Guided the U.S. DoD to reform the military reliability standards, which led to the "Perry Memo" on Standards Reform. Pecht's work led to Army's establishment of a Physics-of-Failure Branch and their use of software generated by CALCE for military systems. Similarly, GM transitioned from military reliability standards and now requires the use of CALCE reliability software in their vehicles under GM specification GM-3172.
- 1992, Conducted physics-of-failure methodology for the reliability assessment of electronics in NASA's Zeno Space Shuttle Experiment. Demonstrated the applicability of the physics-of-failure approach in the design and assessment of the Zeno Program, as a replacement for Mil-Hdbk-217 and progeny.
- 1991, Developed techniques to monitor quality and logistics parameters and to aid in decision support during the design of electronic assemblies, under DARPA's Initiative in Concurrent Engineering (DICE). These techniques were incorporated into Texas Instruments' (Raytheon) CARMA software and commercially marketed.
- 1990, Conducted experimental study of AWACs cooling to determine the temperature profiles of AWACs convectively cooled electronic equipment and developed models for reliability design and assessment.
- 1988–1990, Developed microelectronic packaging design guidelines for the U.S. Air Force. This was the first document of its kind to incorporate physics-of-failure in design (DfR). These guidelines were extended to incorporate commercial and industrial microelectronic packaging trade-offs.
- 1987–1989, Developed reliability models for very high speed integrated circuit (VHSIC) devices and semiconductor packages for the U. S. Air Force.

- 1986–1988, Developed methodologies and computational techniques for derating and preferred parts selection for the U.S. Integrated Electronics Warfare Systems (INEWS) program.

- 1984–1986, Developed the first Reliability and Maintainability Computer Aided Design (RAMCAD) software. Lead to the development of RAMCAD software by more than ten commercial companies.

CONSULTANT

1. Tesla vs Samsung (2023): consultant on battery quality, reliability and safety
2. Testimony and Panelist: on Lithium-ion battery safety, for Consumer Protection Safety Commission (CPSC) Forum, Bethesda, MD, July 27, 2023
3. Ynvisible (2023): consultant on test methods
4. Nia Therapeutics (2023): consultant on tin whiskers of medical devices
5. Finnegan, Henderson, Farabow, Garrett & Dunner LLP (2022 – present), Zhuhai CosMX Battery Co., Ltd., battery expert
6. Nvidia vs Bell for DLA Piper (2022) semiconductor package patents
7. Monterey County District Attorney's Office, California (2022): Emily D. Hickok · Deputy District Attorney: issues related to false advertising and water resistant features on mobile phones·
8. SkyMul (2022): battery management systems for drones
9. Volvo (2022), battery re-use design and practices
10. Proctor & Gamble (2022): battery failure analysis, supply chain assessment, expert report.
11. Proctor & Gamble (2022): product failure analysis, supply chain assessment, expert report.
12. Ferrari (2022), battery management systems
13. Morrison & Foerster (2022): 'trade-secret' arbitration between Advantest America v. AEM, Lattice and Kabbani regarding semiconductor test equipment and methods
14. ITC: (2022): expert : Oil-vaping cartridges, components thereif, and products containing the same, Investigation No. 337-TA-1286 (expert report, deposition, testimony at the ITC).
15. Kuva Systems (2022): MultiSensor Scientific Inc. (2022): expert on electronics for Polar applications.
16. McManis Faulkner (2022 – present): Nalick vs Seagate, Case No. CGC-15-547787: expert on HDD reliability.
17. Bowles and Verna (2020 – present): expert concerning Lott litigation wrt SCI - Plug Power hydrogen tank explosion
18. Wilshire Law Firm (2021-present) Apple class action case regarding water damage and warranty
19. CBC News – Canada (2021-2022) pro-bono consultant on battery testing for consumer products and batteries
20. Beghelli group – Italy (2021) pro-bono work on battery testing and design of experiments
21. Ferrari Italy: Giorgio Gullone team (2021) pro-bono consultant on battery reliability and safety
22. Singapore patent case (2021): consultant on microelectronic packaging (wire bonding)
23. Potter Mariano LLP: Andrew Jennings (2021): consultant on battery explosion (e-cigarette) law case
24. Clayton Utz. (2020 – 2022): expert on failure analysis of SunMetals solar farm (expert report)
25. Celestica (2020 – 2021): consultant regarding supply chains and reliability planning and management
26. Fazio Micheletti LLP (2017 – present): consultant on class action lawsuit concerning Toyota (declaration, deposition)
27. Michael Phelan (2020 - 2021) consultant on e-cigarette explosions law case (expert report)
28. Samsung Class Action on water protection (2020): expert consultant (expert report)
29. Mayer Brown LLP*;* (2019-2020) Expert on supply chains: *Nichia Corporation v. Koninklijke Philips N.V. and Lumileds LLC:* (ICC Arbitration No: 24206/MK): contract arbitration (expert report, testimony)
30. DLA Piper (2020): consultant on BGA patents (declarations)
31. Australian Competition and Consumer Commission (2019 - 2022): consultant on Samsung water protection litigation (expert report, rebuttal report)
32. U.S. Department of Defense discussions on AI in China, Germantown, Maryland (Sept 26, 2019).
33. Senior round-table on artificial intelligence at Lawrence Livermore National Laboratory, hosted by Rick Perry, Secretary of Energy, U.S. Department of Energy (Aug. 25–27, 2019). Discussed artificial intelligence in China, https://www.sfchronicle.com/bayarea/article/Artificial-intelligence-potential-limits-14380228.php
34. Presentation on artificial intelligence to Dimitri Kusnezov and his team, Deputy Under Secretary for Artificial Intelligence and Technology, Office of the Under Secretary for Science (Aug. 22, 2019).
35. Philips HealthCare (2019): consulting related to internal reliability capability.
36. The Netherlands Organisation for Scientific Research (NWO) (2019): pro-bono review of crossover research proposal titled "Living in Smart Cities"
37. Covington & Burling LLP (2019): consultant on ITC trade-secret battery case on behalf of SKI in response to LGChem (expert reports, deposition)
38. Steptoe & Johnson LLP (2019): consultant on ITC LED patent (infringement) case on behalf of Leedarson
39. Kirkland (2019): consultant on heat-not-burn patents.
40. Apple Case Action Litigation (2019 - 2021): expert on reliability and refurbishment issues (expert report, depositions, rebuttal report)
41. Cisco - Bangalore (2019): consultant to assess reliability practices related to outdoor electronic systems.

42. Michael Phelan (2018 - 2019): consultant on various e-cigarette battery reliability and safety law cases. (declaration and deposition in Agrillo case: settled); (Washington case: settled); (Plummer case: settled)
43. Markovits, Stock & DeMarco, LLC (2018-2019): consultant on batteries used in Plantronics products
44. Miller Weisbrod LLP (2018-present): consultant on batteries in e-cigarettes (Tullis/Schexnider)
45. Emerson (2018): assessment of trends that lead to disruption in electronic materials and components
46. Ericsson (2018): consultant on prognostics for electronics
47. Saab (2018): consultant on prognostics for electronics
48. Sheppard Mullin (2018): Nalick vs Seagate, consultant regarding hard disk drives reliability (expert reports)
49. Brouse McDowell (2018): consultant on reliability ligation concerning LEDs. (expert report)
50. Emerson (2018): assessment of supplier fraud.
51. ISID (2018): developed PHM trends document for Japanese aerospace industry.
52. Abbott (2018): provided course lectures on medical electronics, design, test, and supply chains.
53. Alstom (2018): consultant on advanced in prognostics and systems health management.
54. Holland and Knight (2017–2018) IPR on 3 Seoul Semiconductor LED patents (declarations, depositions)
55. Hagens Berman Sobol Shapiro LLP (2017 - present): expert on reliability and refurbishment issues related to Apple devices (declaration, deposition, expert report)
56. Rossman Law Group (2017): Assessment of battery as a potential cause of fire in a tablet (computer)
57. Bing Xu Precision (201 -2018): consultant on SATA connector patents (IPR): (expert reports, deposition)
58. Covington Ltd (2017): consultant on semiconductor encapsulation patents (IPR). US 6,046,076A
59. Huawei (2017): consultant on Li-ion battery testing. Taught course on fundamentals of Li-ion batteries
60. Texas Instruments (2017): Expert on two microelectronic package patents for IPRs. (declarations, depositions)
61. Roadtrack (2017): Short course on automotive electronics reliability and intermittent failures. Consulting on automotive reliability concerns and how to evaluate field failure and warranty data.
62. Hon Hai (Foxconn) (2016): Expert on connector / IC socket patents. (expert reports, depositions, testify in court)
63. IBM: (2016) consultant on batteries for mainframe applications, supply chain management and test development.
64. Nevro (2016 - 2018): consultant on battery cell manufacturing, testing, quality, and reliability for implantable neural stimulators (includes audits of Eagle Pitcher manufacturing facilities in Vancouver and Joplin)
65. Philips Medical (2016): lectures (short course) on best practices in reliability; consultant.
66. Nevro (2016-2017): consultant on manufacturing, defect analysis and reliability of various electronics.
67. Cochlear Inc. (2016 - 2018): consultant on use of new solders and mixed soldering manufacturing processes for implantable hearing devices; analysis of tin whisker tests; analysis of supply chain issues;
68. European litigation (2016): Advokatfirman Vinge KB: reliability analysis of power meters and repair processes. (expert report, court appearance)
69. Aztera SBIR: Standards Development (2016): Consultant.
70. Board of Advisors (2016 - present): Lahore University of Management Sciences, Lahore, Pakistan.
71. English vs Apple Litigation (2015): expert on reliability and refurbishment issues (expert report, deposition)
72. TOK vs Huntsman litigation (2015): expert on process change requirements and management, Mayer-Brown.
73. UB Maxell (2015): Expert on battery patent in US Patent Office (IPR).
74. Garmin Class Action Case (2015): Expert on reliability/remaining useful life of products (expert report).
75. Whirlpool/Sears Class Action Cases (2015): Expert on the reliability of electronics control units of dishwashers and washing machines (expert reports).
76. CEVA (2014): Expert concerning reliability issues associated with the transshipment of containers filled with consumer electronics (expert report).
77. Custom Manufacturing & Engineering, Inc. (2014): expert concerning the supply chain and distribution of counterfeit electronics in military systems (expert report, testified at arbitration hearing).
78. Stratsys (2014): Short course on physics of failure.
79. Emerson (2014): Short courses (series) on reliability and physics of failure; counterfeit electronics; and on advances in RoHS.
80. Nevro (2014): Consultant on battery field issues.
81. Nevro (2014): Consultant on battery reliability and test methods. Evaluated responses to FDA, and aided in FDA approval development for its Senza spinal cord stimulation (SCS) system.
82. ASM (2014): Consultant on Singapore patent regarding molding equipment.
83. Emerson (2014): Study of risks of ROHS compliance in long-term harsh environment industrial applications.
84. U.S. Oversight & Investigations Subcommittee, Committee on Energy and Commerce (2014): Consultant on GM recall and NHTSA handling of the case.
85. CFD Research Corporation (2014): Consultant on SBIR: assessment of reliability risks in using copper wire bonded semiconductor packages in military applications.

86. Chicony Power Technology (2013–2014): Expert on various issues related to supply chain responsibilities and recalls (expert report, testified in Superior Court of California).
87. Medtronic (2013–2014): Consultant on best reliability practices for new medical products development. Helped in development of internal standards. Evaluated reponses to FDA.
88. Amkor (2013–2014): Consultant on MEMS package patent re-examination by US Patent Office (declarations, depositions).
89. Goertek (2013–2014): Consultant on MEMs package patent for IPR (declarations, depositions).
90. Emerson (2013): Study of nanomaterials used in electronics.
91. W.L. Gore (2013): Consultant on electronics corrosion prevention mechanisms.
92. W.L. Gore (2013): Consultant on the effect of dust and dust filters on microphones.
93. Invensense (2013): Consultant on MEMs microphone patents (3 declarations: Petition for *Inter Partes* Review).
94. Eli Lilly-Paul Hastings (2013): Consultant on medical devices and patents.
95. Marvel Semiconductors (2013): Consultant on electronics packaging patents.
96. Nevro (2013): Consultant on best reliability practices for new medical products development.
97. Foxconn (2013): Consultant on connector patent re-examination by US Patent Office.
98. United Technologies Aerospace Systems (Jan. 2013): Consultant on solder joint reliability failures.
99. Taiwan Union Technology Corp. (2012-2013): Consultant on patent issues related to PCB composition/construction.
100. Dow Solar (2013): Reliability consultant and audit of Emerson facilities in Philippines.
101. Bel Stewart (2012–2015): Consultant in litigation concerning the reliability of connectors subject to packaging materials (expert report, testified in court).
102. Analog Devices (2012–2013): Consultant on silicon microphone packaging patents [expert reports, depositions, testified at ITC court; also North District of Illinois Case].
103. Invensys (2012): Consultant on prognostics system health monitoring methods.
104. Moog (2012): Consultant on uprating and counterfeit electronics.
105. Cochlear Ltd. (2012): Consultant on cochlear implant reliability and test methods, audit of PCB supply chain, and best reliability practices for new medical products development.
106. Sjocroma Van Stigt (2012): Consultant on automotive reliability.
107. Philips-Lumiled (2012): Provided courses on LED reliability. Consultant on LED test methods.
108. Micronics-Japan (2011–2012): Consultant on patents related to semiconductor sockets.
109. Emerson (2011): Prepared analysis information for life cycle carbon footprint analysis for electronics.
110. Emerson (2011): Prepared analysis information for conflict materials for electronics.
111. Osram (2011): Consultant on patents related to LED packaging.
112. Foxconn (2011): Consultant on patents related to connectors.
113. Fazio & Micheletti LLP (2011): Consultant on Apple products and reliability [declaration].
114. Anadigics (2011): Developed guidelines for plated copper wire in plastic encapsulated devices.
115. Philips (2011): Consultant on patents related to LEDs.
116. Visiting Professor at Seoul National University (2011): Provided lectures on design for reliability and testing.
117. National University of Singapore (2011): Consultant on alternative eco-friendly solders and wire bonding materials for microsystem applications.
118. Medical Devices Inc. (2011): Consultant on health care medical bed patents [expert report for Fulbright & Jaworski].
119. PACE Automotive Awards (2010 - present): audit finalists - automotive suppliers in Japan and Korea for selection of award.
120. Fireman's Insurance (2010): Consultant on reliability Rogers high-speed laminates for printed circuit assemblies [expert report].
121. Huawei (2010): Consultant on Huawei strategic planning for reliability.
122. Huawei (2010): Consultant on reliability of electronic equipment used in outdoor environments.
123. Analog Devices Inc. (2010): Consultant on MEMS packaging patents [expert reports, depo, testified in ITC court].
124. Huawei (2010): Consultant on reduced air cooling of telecom systems and prognostic methods for fans.
125. Emerson (2009–2010): Consultant on prognostic methods for power supplies, fans, and systems.
126. Bosch (2009): Consultant and short course on accelerated qualification methods.
127. Lenovo (2009): Provided lectures on design for reliability and prognostics methods.
128. Sony (2008–2009): Consultant on product reliability [expert report, deposition].
129. ASE (2008–2009): Consultant on computer and semiconductor package failure mechanisms and qualification methods.
130. Ericsson (2008): Consultant on the use of prognostics and health management in telecom systems.

131. Schlumberger-Houston, Schlumberger-Japan, and Schlumberger-France (2008): Consultant on cost-effective methods for qualification and supplier selection, and implementation of prognostics in product development and field use. Presented and consulted at all the sites.
132. Emerson (2008): Consultant on RoHS requirements and provided position paper on RoHS exemptions for EU.
133. FDA (2007-2008): Consultant tasked with the evaluation of FDA programs and working with FDA research team. Also provided series of reliability courses.
134. Microsoft (2007–2008): Consultant on new supply chain analysis, reliability capability, and reliability assessment techniques. Also provided guidance for the implementation of prognostics in product development and field use.
135. Seiren-Japan (2007–2008): Consultant on gasket patents.
136. Vitronix (2007): Consultant on PCB failures.
137. W.L. Gore (2007): Consultant on water-induced corrosion.
138. TRW (2007): Consultant on CAF/CFF failure mechanisms.
139. Emerson (2007): Consultant on green recycling project with Polytechnic University of Shanghai.
140. Emerson (2007): Consultant on counterfeit electronics and risk management methods.
141. Huawei, China (2007): Consultant on burn-in methods.
142. Siemens (2007): Consultant on conformal coating patent [expert reports, testimony in England court].
143. Lexmark (2007): Provided lectures on reliability methods and consulted on ionic contamination.
144. Forizs & Dogali (2006–2007): Consultant on automotive reliability [expert report].
145. Philips (2006–2007): Consultant on electronic product reliability [expert reports, testimony in European court].
146. Rosneft (2006): Consultant: Providing lectures on reliability methods and assessing supplier reliability practices both in Moscow and Neftegaz - Russia.
147. Emerson (2006): Provided lectures on RoHS to Chinese government advisors.
148. FoxConn (2006): Consultant on connector and socket patents.
149. Intellipark (2006): Consultant on new product reliability and qualification planning.
150. EADS (2006): Consultant on environmental management and prognostics for electronic systems.
151. Lutron (2006): Consultant on Chinese electronics industry, outsourcing and supply chain management.
152. Geico (2005–2012): Consultant on vehicle electronics reliability [depo].
153. ST Microelectronics (2005–2007): Consultant on IC packaging patents [expert reports, deposition].
154. Holland & Knight (2005–2006): Consultant on reliability of electronics module for U.K. Ministry of Defence.
155. Boeing Company (2005): Consultant on Chinese electronics industry, outsourcing, and supply chain management.
156. United Nations (2005): Expert on China's electronics industry and market access.
157. Goldman, Sachs & Co. (2005): Venture capital assessment of new product.
158. Tessera (2005): Consultant on IC packaging patents.
159. FreeScale (2005): Consultant on IC packaging.
160. Philips (2005): Consultant on mold compound reliability.
161. On-Semiconductor (2005): Consultant on semiconductor reliability.
162. ACEL, Beijing China (2005): Guest faculty and lecturer.
163. Emerson Network Power: Avansys (2004–2005): Training and reliability capability audits.
164. Lutron (2004): consultant on reliability organization.
165. The National Academies: (2004): Consultant on defense manufacturing base issues (printed circuit technologies).
166. Fish and Richardson (2004): Consultant on Osram and Dominant photo-optic devices and patents.
167. IEEE Spectrum, Asia Technology Panel (2004): Consultant on Asian technology trends.
168. HP (2004). Consultant on computer reliability.
169. Brault et al. (2004): Consultant on reliability of electronic equipment subject to fire damage [expert reports, deposition].
170. Stactek (2004): Consultant on die stack patent.
171. Astek (2004): Conducted reliability capability audit and wrote report.
172. Sullivan & Cromwell, LLP (2003-2004): Consultant on electronics product reliability [deposition].
173. Weil, Gotshal and Manges (2003): Consultant on Samsung electronics packaging patent.
174. Motorola (2003–2004): Consultant on Motorola electronics packaging patent.
175. Huawei, China (2003): Consultant on electronics uprating. Consultant on electronics reliability. Provided courses on reliability.
176. Texas Instruments (2003): Consultant on PCMCIA patent.
177. Herbst LaZar Bell (2003): Consultant on electronics upgrade for Northrop-Grumman military - avionics detect and jam system.
178. Emerson (2002–2003): Consultant on reliability capability assessment plan, and lead-free product development.
179. Westinghouse (2002–2003): Team leader on DoD-homeland security project, to assess opportunities and risks associated with potential Weapons of Mass Disruption (WMd), after the 911 crisis.

180. Jones Day (2002): Consultant on 3-D packaging patents associated with Simple and DensePak.
181. Technobit, Spain (2002): Consultant on design for reliability. Also provided a two day, in-house short course.
182. United Defense (2002): Consultant on design for reliability. Also provided a two day, in-house short course.
183. John Rodman and Associates (2002): Consultant on automotive electronics reliability issues [deposition].
184. Johnson, Clifton, Larson & Corson (2001–2002): Consultant on automotive electronics reliability issues.
185. Pancratz LTD. (2001–2002): Consultant on motor vehicle ignition modules and warranties.
186. Schlumberger (2001–2002): Evaluated reliability assessment methods and provided next generation design-for-reliability practices for oil well equipment.
187. Huawei (2001): Consultant on electronics uprating and electronics reliability. Provided course on reliability.
188. Medtronic (2001): Consultant on parts reliability for medical products. Provided short course on device encapsulation.
189. Hamilton-Sundstand (2001): Presented short courses on parts selection and management and PWB assembly. Reviewed design methods used by Hamilton-Sundstrand and provided recommendations for improvements.
190. St. Jude Medical (2001): Consultant on parts reliability for medical products.
191. Emerson Electronics (2000–2001): Lead team to evaluate potential PCB fabrication and assembly facilities in Taiwan and China. Also provided reliability short courses for Emerson employees in the U.S. and China.
192. WTEC (2000): Team leader to interview and evaluate Chinese semiconductor and electronic packaging industry.
193. Murray and Murray (1999–2002): Consultant on various automotive electronics reliability issues.
194. Jones Day (1999–2001): Consultant on electronic packaging patents associated with Texas Instruments and Tessera. [District Court: expert report, deposition]
195. Finnegan et al. (1999–2001): Consultant on electronic packaging patents associated with Altima and Intel. [ITC: expert report, deposition and testified]
196. Microsoft (1999–2001): Reliability education program for Microsoft employees.
197. Arter & Hadden (1999–2000): Consultant on reliability assessment of computer monitors associated with Tatung and Apple Computers. [ICC: expert reports, deposition and testified]
198. ERS Inc. (1999): Reliability assessment of advanced autonomous amphibious vehicle (AAAV) for U.S. Marines.
199. AlliedSignal (1999): Reliability assessment of a failed electronics assembly.
200. Aspect (1998): Strategic planning and development of an electronics parts database.
201. Johnson Wax (1998): Reliability assessment of a new product.
202. GM Truck (1998): Team leader to assess the reliability of an electronic assembly, and develop and validate an alternative. ITT Automotive (1998): Reliability analysis of an electronic assembly.
203. Hancock, Rothert & Bunshoft LLP (1997–2001): Consultant on Ford thick film ignition modules. [District Court: expert report, deposition and testified]
204. Howrey & Simmon, Washington, DC (1997–1998): Consultant on a fuse product patent.
205. Sun Microsystems (1997): Consultant on computer hardware reliability.
206. Teradyne (1997): Consultant on supplier's reliability plans and assessment methods.
207. Heart Stream (1997): Consultant on a medical electronics product.
208. Smiths Industries (1996): Evaluated electronics parts management program.
209. AlliedSignal (1996): Headed up team to prepare a company-wide parts management program.
210. Boeing Commercial Airplane Group (1996): Advisory board to evaluate three key BCAG reliability policy documents: Electronic Components Management Program; Reduced Infant Mortality; and Reliability Enhancement Testing.
211. Boeing Commercial Airplane Group (1996): Board of advisors/consultant to provide guidance to BCAG Vice Presidents on key reliability challenges facing the BCAG avionics community.
212. WTEC (1996): Team leader to evaluate Singaporean and Malaysian semiconductor and electronic packaging industry.
213. Jones Day (1995–1996): Consultant on Texas Instruments plastic encapsulation process and leadframe patents. [testified].
214. WTEC (1995): Team leader to interview and evaluate Korean semiconductor and electronic packaging industry.
215. Hong Kong University of Science and Technology (1995): Helped develop Hong Kong electronics industry/government/ academia roadmap.
216. Alliantech, Annapolis, MD (1995): Helped develop ruggedized (COTS) computer systems.
217. Teltech Network of Experts (1994–1998): Consultant on various short term studies for electronics industry.
218. Institute for Defense Analyses (1994–1996): Electronics packaging study for U.S. government, including life cycle engineering requirements for reliable electronics design, simulation and assessment.
219. Trident (1994): Consultant on packaging materials patents.
220. Textron (1994): Helped develop parts selection methodology.
221. PPG (1994): Conducted reliability study of woven E-glass fabrics used in circuit cards.

222. United Technology-Photonics (1993–1995): Consultant on screening and reliability assessment of opto-electronic integrated circuits.
223. JTEC (1993): Conducted interviews and evaluation of Japanese electronic packaging industry.
224. United Nations (1993): Mission Expert. Lectures for Indian Space Agency on electronics reliability.
225. Sweetheart Paper (1993): UMD Technology Extension Service (TES) Project.
226. Paramax, Boston, MA (1992): Conducted lead failure analysis study.
227. Aventek, Annapolis, MD (1991): Conducted study on infrared experimentation of circuit cards.
228. Westinghouse, Baltimore, MD (1991): Identified methods to improve cost-effective parts selection in the design of the ARSR-4 ground based radar.
229. Howrey & Simmon, Washington, DC (1991): Consultant on electronic product patents.
230. U.S. Air Force (1991): Provided training on AVIP concepts to Air Force contractors.
231. Cetar, Ltd., Subsidiary of Philips (1990–1991): Company board of advisors.
232. UNISYS, MN (1990): Investigated reliability development growth tests for avionics on the B-2.
233. MALCO Plastics, Gaithersburg, MD (1990). UMD Technology Extension Service (TES) Project.
234. Union Camp, Rockville, MD (1988–1989). UMD Technology Extensions Service (TES) Project.
235. GTE, Needham, MA (1987). Consultant on thermal analysis of circuit cards.
236. Department of Natural Resources, Madison, WI (1977). Conducted ozone monitoring tests throughout the state of Wisconsin.

PROFESSIONAL SOCIETIES

Fellow	American Society of Mechanical Engineers (ASME) Institute of Electrical and Electronics Engineers (IEEE) American Society of Materials – International (ASM) Society of Automotive Engineers (SAE) Int'l Microelectronics and Packaging Society (IMAPS)
Senior Member	Institute of Environmental Sciences and Technology (IEST) Association for the Advancement of Artificial Intelligence (AAAI) Institute for Interconnecting and Packaging Electronic Circuits (IPC) ASM - Electronic Device Failure Analysis Society (EDFAS) Surface Mount Technology Association (SMTA)

PROFESSIONAL SERVICES

Board of Directors	Scientific Advisory Board: Alstom- France (2015–2018) Early-Bird Alert Inc. (2008–2016) The Prognostics and Health Management Society (2009–2010) Energetic Technology Center, Maryland (2007) Airpax, a Subsidiary of Philips (1998)
Editor-in-Chief	Elsevier e-Prime: Electronics, Electrical Engineering and Energy, (2021 – present) ASME Open Engineering Journal (2021 – 2022) Life Cycle Reliability and Safety Engineering, Springer Pub. (2012– 2021), formerly, SRESA Circuit World (2019– 2020) IEEE Access (2012–2018) International Journal of Performability Engineering (2011–2012) Microelectronics Reliability International – Elsevier (1996–2012) IEEE Transactions on Reliability (1988–1997) The Wisconsin Engineer Magazine (1979–1980)
Associate Editor	IEEE Transactions on Electronic Components, Packaging and Manufacturing Tech. (1995–2010) International Microelectronics Journal (1995–2002) SAE Journal of Reliability, Maintainability and Supportability (1993–1997) IEEE Transactions on Reliability (1987–1988)
Editor-at-Large	Marcel Dekker: Electrical Engineering and Electronics (1991–1993)
Editorial Board	Circuit World (2020 – 2021) eTransportation (2019–present) IEEE Access (2019– 2021) Energies, MDPI AG, Switzerland (2015–present) Journal of Electronic Measurement and Instrument (2014–2020) Chinese Journal of Aeronautics (2013– 2020) Journal of COMADEM, Honorary Regional (2013) Proceedings of the ICMR (2013) Journal of Systems Engineering and Electronics, China (2011– 2020) Journal of Reliability and Risk Analysis: Theory and Applications (2009) KSME International Journal, Korean Society of Mechanical Engineers (1997–2005) IEEE Spectrum (1993–1995) Journal of Electronics Manufacturing (1990–1999) Journal of Concurrent Engineering (1990–1992)
Chairperson	International Scientific Advisory Panel (ISAP) for the Offshore Robotics for Certification of Assets (ORCA) Hub. The Hub is a collaboration of experts from 5 United Kingdom universities and more than 30 industry partners with expertise in subsea, ground and aerial robotics, human-machine interaction, asset management and certification, and innovative and low-cost sensor networks. IEEE Reliability Prediction Assessment Guidebook #1413.1 (1999–2002)

IEEE Standard Methodology for Reliability Prediction and Assessment for Electronic Systems and Equipment #1413 (1995–1998)
IEEE Reliability Program Standard #1332 (1995–1998)

Conference Chair

Symposium on Solder Interconnect Reliability, National University of Singapore, Singapore, December 8–11, 2015
IEEE PHM 2015, 2015 Prognostics and System Health Management Conference, Beijing, China, October 21–24, 2015
IEEE PHM 2014, 2014 Prognostics and System Health Management Conference, Zhangjiajie, Hunan, China, August 24–27, 2014
IEEE Prognostics and System Health Management Conference, May 23–25, 2012, Beijing, China

General Chair, Founder, and Organizer

Battery Management Systems for High Operational Availability and Safety Conference, Shenzhen, China, May 21, 2012
IEEE Prognostics and Systems Health Management Conf., Shenzhen, China, May 24–27, 2011
International Conference on Reliability, Maintainability and Safety (ICRMS 2011), Guiyang, China, June 2011
2nd International Conference on Reliability, Safety and Hazard-2010 (ICRESH 2010), New Mumbai, India, Dec. 14–16, 2010
IEEE Prognostics and Health Management Conference 2010 (PHM-2010 Macau), Macau, P.R China, Jan. 12–14, 2010
Prognostics and Health Management, ASME 2009 DETC & CIE Conference, San Diego, CA, Aug. 30-Sept. 2, 2009
2009 8th International Conference on Reliability, Maintainability and Safety (ICRMS 2009), Chengdu, China, July 20–24, 2009
Int'l Conf. on Reliability, Maintainability and Safety 2007, Beijing, China (2007)
2004 Int'l Conf. on the Business of Electronic Product Reliability and Liability, Shanghai, China, April 27–30, 2004
IEEE Conf. on Business of Electronic Product Reliability and Liability, Hong Kong and Shenzhen, China, Jan 13–17, 2003

Member

Evaluator: SAE International Award - Quality Leadership honoring Subir Chowdhury (2020 – 2023)
Education committee; EDFAS- ASM (2015– 2023)
Association for the Advancement of Medical Instrumentation: Cochlear Implant Committee
IEEE Publications and Strategic Planning Board (PSPB) (2012–2018)
IEEE Standards Association (2000–2009)
U.S. Army Research, Development Engineering Command Reliability Focus Team (2008)
UL Standards Committee (2001–2008)
IEEE Representative to Int'l Reliability Standards Committee (1993–1995)
SAE Automotive Reliability Standards Committee (1990–1993)
Navy Electronics Manufacturing-Policy Committee (1992)

MEDIA PRESENTATIONS and INTERVIEWS

1. The Wall Street Journal: why heat is bad for smartphone batteries, August 2023:
2. International Business Times, M. Basilan, "China may have built third Exascale supercomputer - And may be hiding its real capabilities", 2023. [Online], Available: https://www.ibtimes.com/china-may-have-built-third-exascale-supercomputer-may-hiding-its-real-abilities-3712987
3. The Atlantic magazine: "E-bikes are going to keep exploding", July 25, 2023: https://www.theatlantic.com/technology/archive/2023/07/e-bike-battery-lithium-ion-fire/674622/:
4. National Public Radio (NPR): "Arizona's extreme heat could be a problem for electric car batteries", July 24, 2023
5. National Public Radio (NPR): "The role of global warming on our EVs?", July 20, 2023
6. National Public Radio (NPR): "What's driving the battery fires with e-bikes and scooters?", March 11, 2023
7. Insider Interview (publication): "The weird, worrisome mystery behind America's plague of purple streetlights", Nov 29, 2022.
8. Capital Report Interview: (October 18, 2022), "How did China become a powerful player in the chip-making industry" https://www.ntd.com/professor-how-chinas-microchip-monopoly-grew_857535.html
9. Washington Post Interview: Fowler, G. A. (2022, August 19). You're charging wrong: 5 ways to make Gadget Batteries last longer. The Washington Post. Retrieved August 23, 2022, from https://www.washingtonpost.com/technology/2022/08/19/battery-charging-tips/
10. ABC Radio National in Australia, "The State of TSMC in the Global Marketplace" Aug 2022
11. B. Ellis and M. Hicken, "Dozens of Amazon's own products have been reported as dangerous -- melting, exploding or even bursting into flames. Many are still on the market", *CNN*, 2020. [Online]. Available: https://www.cnn.com/2020/09/10/business/amazonbasics-electronics-fire-safety-invs/index.html. [Accessed: 14-Sep- 2020]
12. M. Taniguchi, "Report safety issues to dozens of Amazon Basics. Alexa compatible microwave oven, etc", *Engadget*, 2020. [Online]. Available: https://japanese.engadget.com/amazon-basics-products-safety-risk-073043339.html. [Accessed: 14- Sep- 2020]
13. Saxena S., and M. Pecht, "Accelerated Life Testing of Lithium-ion Batteries," Contributed Commentary, *Battery Power*, June 16, 2020. https://www.batterypoweronline.com/news/accelerated-life-testing-of-lithium-ion-batteries/
14. Diao, W., L. Kong, and M. Pecht. "Why the LG Chem Advertisement about Lithium-ion Batteries is Irresponsible," Battery Power newletter, Feb. 27, 2020. https://www.batterypoweronline.com/news/why-the-lg-chem-advertisement-about-lithium-ion-batteries-is-irresponsible/
15. Kong, Lingxi, and Michael G. Pecht. 2020. "A Look Inside Your Battery: Watching the Dendrites Grow." Battery Power Online. 2020. Available online: https://www.batterypoweronline.com/news/a-look-inside-your-battery-watching-the-dendrites-grow/.
16. M. G. Pecht, "Exploding E-Cigarettes Are a Growing Danger to Public Health - IEEE Spectrum." [Online]. Available:https://spectrum.ieee.org/consumer-electronics/portable-devices/exploding-ecigarettes-are-a-growing-danger-to-public-health.
17. Nikkei: "Aftermath of friction between the United States and China in the "brains of the world" United States, Huawei review," March 17, 2019.
18. CNN's Drew Griffin Investigates a Toyota Engineering Memo that Suggests an Electronic Problem in a Prototype Car, CNN Video, http://www.cnn.com/video/#/video/bestoftv/2012/03/02/ac-griffin-toyota-investigation.cnn; http://www.cnn.com/2012/03/01/us/toyota-acceleration-documents/index.html?iref=allsearch, March 1, 2012.
19. Zuga, L. and M. Pecht, "The Politicization of Counterfeit Electronics," Battlespace Update, Vol. 15, Issue 01, Jan. 5, 2012; "Misplaced Blame: The Politicization of Counterfeit Electronics," SLD (sldinfo.com) website, Dec. 14, 2011.
20. "Don't Blame the Chinese-Blame Raytheon," Letter to the Editor, Circuitnet website: (*http://www.circuitnet.com/articles/article_85572.shtml*), Nov. 23, 2011.
21. The Counterfeit Electronics Problem - Trying to Reach Harmony in a Storm, Int'l Conf. on Economics, Politics, and Security of China and the USA, Nov. 19, 2011 (televised live on Voice of America)
22. ACTUS, L'Offensive Made in China (*in French*), pp. 26-27, June 2011.
23. CNN, interviews on Toyota and sudden acceleration and congressional hearing, March 2, 2010.
24. NPR, Toyota Recalls Spur worries-Sudden Acceleration in Toyota Vehicles, Feb. 3, 2010.
25. History Channel Modern Marvels: Engineering Disasters, Tin Whiskers, March 22, 2006.
26. CNN with Lou Dobbs, China's Semiconductor Industry and Exporting, Sept 16, 2004.
27. Newsnight Maryland, Maryland Public Television: Electronics Industry, June 8, 1998.

PATENTS

1. Systems, Methods, and Devices for Health Monitoring of an Energy Storage Device, B. Sood, M. Osterman, M. Pecht, U.S. Patent # 11,609,210, March 23, 2023 (USA).
2. Systems, Methods, and Devices for Health Monitoring of an Energy Storage Device, B. Sood, M. Osterman, M. Pecht, U.S. Patent # 10,673,101 B2, June 2, 2020 (USA).
3. Embedded Sensors for In-Situ Cell Monitoring of Batteries, A. Fortier, Y. Xing, and M. Pecht, U.S. Patent # 2018/0321325 Al, Nov. 8, 2018 (USA).
4. Systems, Methods, and Devices for Health Monitoring of an Energy Storage Device, B. Sood, M. Osterman, M. Pecht, U.S. Patent # 10,014,561, July 3, 2018 (USA).
5. 3D RF Mems Biosensor for Multiplexed Label Free Detection, A. Vasan, M. Pecht, and A. Kluger, U.S. Patent # 9,151,723, Oct. 6, 2015 (USA).
6. Energy Harvesting Using RF MEMS, Ravi Doraiswami M. Pecht, A. Vasan, Y. Huang, and A. Kluger, U.S. Patent # 8,859,879, Oct. 14, 2014 (USA).
7. Wireless Biosensor Network for Point of Care Preparedness for Critical Patients, R. Doraiswami, M. Pecht, A. Vasan, Y. Huang, and A. Kluger, U.S. Patent #8,878,667, Oct. 14, 2014 (USA).
8. Method to Extract Parameters from in-situ Monitored Signals for Prognostics, Vichare, N., and M. Pecht, U.S. Patent # 8,521,443, Aug. 27, 2013 (USA).
9. Prognostics and Health Management Implementation for Self Cognizant Electronic Products, M. Pecht, and J. Gu, U.S. Patent #8,494,807, Jul. 23, 2013 (USA).
10. MEMS Barcode Device for Monitoring Medical Systems at Point of Care, R. Doraiswami, M. Pecht, A. Vasan, Y. Huan, and A. Kluger, U.S. Patent # 8,424,765, Apr. 23, 2013 (USA).
11. A Prognostics and Health Management Method for Aging Systems, M. Pecht and S. Cheng, U.S. Patent # 8,423,484, Apr. 16, 2013 (USA).
12. Electromechanical Device Having a Plurality of Bundles of Fibers for Interconnection of Two Planar Surfaces, U.S. Patent # 7,220,131, May 22, 2007 (USA).

HONORS AND AWARDS

1. 2021 Distinguished University Professor. The title of Distinguished University Professor is the highest academic honour bestowed by the University of Maryland.
2. 2020 Ranking of Top 1000 Scientists in the field of Computer Science and Electronics: Ranked 406 in the world ranking and 264 in United States
3. IEEE Eastern Region Outstanding Professional Award: "For technical contributions and leadership in the area of electronics reliability, safety and sustainability" (2020)
4. Awarded Fellow: ASM-International (2020).
5. Recognized as a Highly Cited Researcher in 2019 by the Web of Science Group. For his exceptional research influence, demonstrated by the production of highly cited papers that rank in the top 1% by citations in 2019 in Web of Science.
6. Awarded: PHM Lifetime Achievement Award, PHM Society, Sept. 2019.
7. Awarded: IEEE CPMT Technical Field Award (2016).
8. Awarded: 2015 Applied Energy Award – most highly cited research paper. Xing, Y., W. He, and M. Pecht, "State of Charge Estimation of Lithium-ion Batteries Using the Open-circuit Voltage at Various Ambient Temperatures," *Applied Energy*, Vol. 113, pp. 106–115, Jan. 2014.
9. Best Student Paper Award of Conference (2016): N. Jordan Jameson, Kai Wang, Carlos Morillo, Michael H. Azarian, and Michael Pecht, "Health Monitoring of Solenoid Valve Electromagnetic Coil Insulation under Thermal Deterioration," *Proceedings of MFPT 2016/ISA's 62nd* IIS, Dayton, OH, May 24-26, 2016.
10. Awarded: 2016 Chinese Academy of Sciences President's International Fellowship.
11. Best paper award: Fan, J., ChengQian, Fan, X., Zhang, G., and M. Pecht, "In-situ Monitoring and Anomaly Detection for LED Packages Using a Mahalanobis Distance Approach," *The First International Conference on Reliability System Engineering & Prognostics and System Health Management Conference-Beijing* (2015 ICRSE & PHM-Beijing), Beijing, China, October 23, 2015.
12. Awarded the distinction of "Honorary Professor" by the Harbin Institute of Technology (HIT) in Harbin, China, on July 16, 2015. The Honorary Professor award was granted to Prof Pecht for his technical expertise batteries and for his involvement with HIT in battery research. HIT was established in 1954 and is a member of the prestigious C9 League of Chinese universities. HIT was ranked 10th in the ranking of "Best Global Universities for Engineering" by *U.S. News & World Report* in 2015.

13. Awarded: 2015 Distinguished Scientist: Chinese Academy of Sciences President's International Fellowship.
14. IEEE Access was awarded the 2015 PROSE Award winner in the subject category of "Journal/Best New STM (Scientific, Technical, and Medical)." Prof. Pecht is the Editor-in-Chief of IEEE Access. The American Publishers Award for Professional and Scholarly Excellence (PROSE) annually recognize the very best in professional and scholarly publishing by bringing attention to distinguished books, journals, and electronic content. IEEE Access was also a finalist for the Award for Excellence in Physical Sciences and Mathematics.
15. "Academic Excellence Award" by the Electronics Components Industry Association (ECIA). The award is used to recognize outstanding academic projects 'that reference the application of advanced technologies for passive electronic components'. Peter, Anto, Michael H. Azarian, Michael Pecht, "Step Stress Testing of Electric Double Layer Capacitors," International Capacitor and Resistor Technology Symposium, Santa Clara, CA, April 2014.
16. 2014 Corporate Connector of the Year from the University of Maryland, College Park: The Corporate Connector Award celebrates those individuals or units on campus that do the most to promote and connect UM with the private sector to advance research, partnerships, and scholarship.
17. 4th most cited article in Transactions of the Institute of Measurement and Control over five years (2009 -2014): Pecht, M. and Gu, J., "Physics-of-failure-based Prognostics for Electronic Products," Trans. of the Institute of Measurement and Control, Vol. 31, No. 3/4, pp. 309–322, 2009, DOI: 10.1177/0142331208092031
18. 2013: Received gift of $750k for research into automotive reliability from Hagans, Berman, Sobol, Shapiro LLP
19. 2013 IEEE Educational Activities Board/Standards Association (EAB/SA) Standards Education Award "for continued leadership in developing and promoting standards education in the field of reliability engineering."
20. Outstanding Paper Award (2013): for Williard, N., W. He, M. Osterman, and M. Pecht, "Reliability and Failure Analysis of Lithium Ion Batteries for Electronic Systems," International Conference on Electronic Packaging Technology and High Density Packaging (ICEPT-HDP), Aug. 2012.
21. University of Wisconsin-Madison College of Engineering Distinguished Achievement Award (2013). In recognition of the eminent Professional contributions as a "world-renowned professional engineer and educator whose innovations in reliability and prognostic methods have made a significant contribution to the field of electronics"
22. Most downloaded article in Microelectronics Reliability for the years 2012, 2013, 2014: Chang, M-H, D. Das, P.V. Varde, and M. Pecht, "Light Emitting Diodes Reliability Review," Microelectronics Reliability, Vol. 52, No. 5, pp. 762–782, May 2012.
23. First Place, IEEE PHM 2012 Prognostic Challenge, Academic Category (2012): for successfully extracting degradation features from vibration data and developing fault propagation models to accurately predict the remaining useful life of bearings. The CALCE team included Arvind Vasan, Edwin Sutrisno, Wei He, Moon-Hwan Chang, Jing Tian, Yan Ning, Hyunseok Oh, and Surya Kunche.
24. Best Student Paper Award of Conference (2012): for Chauhan, P., M. Osterman, and M. Pecht, "Canary Approach for Monitoring BGA Interconnect Reliability under Temperature Cycling," MFPT 2012: The Prognostics and Health Management Solutions Conference, Dayton, OH, April 24–26, 2012.
25. Overall Best Conference Paper from Academia (2011): for Haddad, G., P. Sandborn, and M. Pecht, "Method for Valuating Options Arising in PHM," Proc. of 2011 IEEE PHM Conference, Denver, CO, June 2011.
26. Inducted to 2011 Innovation Hall of Fame at the A. James Clark School of Engineering, University of Maryland (2011): for pioneering innovations in advanced reliability and prognostic methods for electronics.
27. Maurice Simpson Technical Editors Award for best paper of the 2010 year (2010): for Gu, J. and M. Pecht, "Prognostics and Health Assessment Implementation for Electronic Products," J. of the IEST, Vol. 53, Num 1, pp. 44-58, April 2010.
28. Indian Society of Reliability, Maintainability and Safety Lifetime Reliability Achievement Award (2010): On Dec. 16, 2010 in Mumbai, India, Dr. Pecht received the first and highest reliability award of its kind of India for his "significant contributions in the area of product reliability, prognostics & health management of electronic components."
29. CPMT Society Exceptional Technical Achievement Award (2010): to recognize for exceptional technical achievement in the fields encompassed by the CPMT Society. "Dr Pecht is recognized worldwide for his seminal contributions in the area of electronics reliability from which he has developed a new and significant field of prognostics for electronics. This includes models that enable in-situ assessment of the deviation or degradation of a product from expected normal operating conditions and the prediction of the future state of reliability of that product. Michael's contributions in this area span more than 20 years and his subject matter expertise is disseminated in a book, several book chapters, handbooks, numerous articles, invited talks and short courses presented worldwide."
30. Society of Automotive Engineering (SAE) Fellow (2010): for his research and promotion of the reliability of the electronic parts and systems used in automotive and aerospace applications.

31. National Defense Industrial Association award (2009) for CALCE for demonstrating outstanding achievement in the practical application of Systems Engineering principles, promotion of robust systems engineering principles throughout the organization, and effective systems engineering process development.
32. University of Maryland Outstanding Faculty Research Award (2009): to recognize research contributions and exceptionally influential research accomplishments by engineering faculty.
33. Outstanding Paper, I-Connect (Connecting the Global Electronics Supply Chain), (2009): for the paper, He, X., M. Azarian, and M. Pecht, "Comparative Assessment of Electrochemical Migration on PCBs with Lead-Free and Tin-Lead Solders," SMT Online Magazine.
34. The Alexander Schwarzkopf Prize for Technological Innovation (2008): awarded to National Science Foundation (NSF) Industry/University Cooperative Research Centers that have had a significant impact on the world. CALCE won the award for its research on physics-of-failure reliability analysis methods and advanced supply chain management concepts for electronic products and systems.
35. Best Paper Award (2008): for the 62nd Meeting of the Society for Machinery Failure Prevention Technology. Gu, J., Barker D., and M. Pecht, "Prognostics of Electronics under Vibration Using Acceleration Sensors," Proceeding for 62nd Meeting of the Society for Machinery Failure Prevention Technology (MFPT), Virginia Beach, VA, May 2008, pp. 253-263.
36. Maurice Simpson Technical Editors Award (2008) for best 2007 article in IEST. Sony Mathew, Diganta Das, Michael Osterman, Michael Pecht, Robin Ferebee, and Joseph Clayton, for their paper, "Virtual Remaining Life Assessment of Electronic Hardware Subjected to Shock and Random Vibration Life Cycle Loads," Journal of the IEST, Vol. 50, No. 1, pp. 86–97, April 2007.
37. Japan Society for the Promotion of Science Fellowship (2008): for research in prognostics in electronics.
38. IEEE Reliability Society's Lifetime Achievement Award (2007): recognizes Prof. Pecht's long-term contributions to the Reliability Society, reliability research, and reliability education, all benefiting the reliability community.
39. European Micro and Nano-Reliability Award (2007): for outstanding contributions to reliability research.
40. Distinguished International Service Award (2006) for significant contributions to the development of international institutional programs at the University of Maryland; and a distinguished international career.
41. Grand Fellowship of the Mirce Academy, England (2005): the highest award that the Academy can bestow upon an individual in recognition of their unique contribution to the understanding and/or predicting of the motion of functionability through system life, at the global level of significance.
42. IEEE Best Paper of the Year (2004) Award: for paper titled "Characterization of Hygroscopic Swelling Behavior of Mold Compounds and Plastic Packages."
43. The Royal Society, United Kingdom, Kan Tong Po Electrical Engineering Visiting Professorship Award at City University in Hong Kong (2002).
44. George E. Dieter Chair Professor of Mechanical Engineering, for significant contributions to the reputation of the Department, College and University with the establishment of CALCE Electronic Products and Systems Center (2001).
45. IEEE Standards Award for chairing and developing IEEE Standard Methodology for Reliability Prediction and Assessment for Electronic Systems and Equipment #1413 (2000).
46. IEEE Standards Award for chairing and developing IEEE Reliability Program Standard #1332 (2000).
47. 3M Research Award for "research work in the electronics reliability area that has made significant contributions to the scientific understanding of material properties and their complex behavior" (1999).
48. ASME Electrical and Electronic Packaging Division (EEPD) Award "for outstanding contributions to the field of application of engineering mechanics to electronic packaging" (1999).
49. IEEE Undergraduate Teaching Award, "for the development and realization of a cross disciplinary educational program in Computer Aided Life Cycle Engineering (CALCE)" (1999).
50. Outstanding paper of the year for the Microelectronics Int'l Journal, "Popcorning in PBGA Packages during IR Reflow Soldering," P. McCluskey, R. Munamarty, and M. Pecht, Vol. 42 Nr. 1, (1997).
51. ISHM/IEPS William D. Ashman Memorial Achievement Award (1997), "for his numerous contributions to academia and the electronics packaging industry."
52. IEEE Reliability Society's Annual Reliability Award (1996), "for his contributions to the IEEE Trans. on Reliability, his work with CALCE Electronic Packaging Research Center and his work on Reliability Standards."
53. Faculty Achievement Award (April 1996), "in recognition of outstanding contributions to industrial research enabled by the Technology Initiatives Program."
54. American Society for Quality Control: Reliability Division, Austin Bonis Award for the Advancement of Reliability Education (1996) for outstanding achievement in the advancement of reliability education.
55. Institute of Environmental Sciences Reliability Test and Evaluation Award (1996), "for vital contribution to the development and promotion of physics-of-failure modeling and analysis as a valuable reliability design and test process in the government, commercial and academic communities."

56. ASME Fellow (1995), “for promoting the art, science, and practice of mechanical engineering.”
57. National Aeronautics Space Agency (NASA) certificate of “recognition of your significant contributions in the preparation and execution of the successful Second U.S. Microgravity Payload (USMP-2) Mission, launched on March 4, 1994.”
58. IEEE Fellow (1992), “for effectiveness in leadership in the development and realization of an exemplary program and successful efforts to raise the level of engineering excellence and practice within and without the organization.”
59. Int’l Electronic Packaging Society (IEPS) Educational Award “for excellence in research and education at the University of Maryland CALCE Electronics Packaging Research Center (1990).”
60. Best paper of the year (Maurice Simpson Technical Editors Award) for the Journal of the Institute of Environmental Sciences, “Reliability Prediction of Electronic Packages,” May/June 1990.
61. Best paper award, “How Failure Prediction Methodology Affects Electronic Equipment Design,” with C. Leonard, Power Conversion Conf., Long Beach, CA, Oct. 16–19, 1989.
62. Westinghouse Professor (1987-1988).
63. Visiting Scholar Award, Excellence in Reliability and Maintainability, Air Force Institute of Technology, Wright Patterson Air Force Base, Dayton, OH, June 15–July 10, 1987.
64. Outstanding Systems Engineering Faculty, (1986–1987), Systems Research Center, Univ. of Maryland.
65. Engineering Research Center’s University of Maryland, Technology Advancement Program (TAP) Award (1986).

PUBLICATIONS

Books Authored/Edited

1. Anand, D., D. Hazelwood, M. Pecht, Sami Ainane, and Vincent Nguyen, *Engineering for Social Change: Revisited,* CALCE EPSC Press, University of Maryland, College Park, MD, 2022.
2. Mellal, Mohamed A., and Pecht, M., *Nature-Inspired Computing Paradigms in Systems: Reliability, Availability, Maintainability, Safety and Cost (RAMS+C) and Prognostics and Health Management (PHM)*, Academic Press, Amsterdam, 2021.
3. Kyeong, San and Pecht, M., *Connectors: Design, Manufacture, Test and Selection,* Wiley – IEEE Press, New York, NY, 2020.
4. Ardebili, H., Zhang, J., and Pecht, M., *Encapsulation Technologies for Electronic Applications*, 2nd ed., Elsevier, 2019.
5. Hazelwood, D. A., Sanchez, M. C., Anand, D. K., Pecht, M., *The True Cost of Waste: Current Issues in Electronic Waste*, CALCE EPSC Press, College Park, MD, 2018.
6. Pecht, M., and M. Kang, *Prognostics and Health Management of Electronics: Fundamentals, Machine Learning, and the Internet of Things*, Wiley, New York, NY, 2018.
7. Varde, P.V., and M. Pecht, *Risk-Based Engineering,* Springer Singapore, 2018.
8. Anand, D., D. Hazelwood, M. Pecht, and M. Kapilashrami, *Engineering for Social Change: Engineering Is Not Just Engineering,* CALCE EPSC Press, University of Maryland, College Park, MD, 2016.
9. Chung, H. S., H. Wang, F. Blaabjerg, and M. Pecht, *Reliability of Power Electronic Converter Systems*, The Institution of Engineering and Technology, London, United Kingdom, 2015.
10. Fries, A., W. P. Cherry, R. G. Easterling, E. A. Elsayed, A. V. Huzurbazar, P. A. Jacobs, W. Q. Meeker JR, G. Nagappan, M. Pecht, A. Sen, and S. V. Wiel, *Reliability Growth: Enhancing Defense System Reliability*, The National Academies Press, Washington, DC, 2015.
11. Kapur, K., and M. Pecht, *Reliability Engineering*, John Wiley, Hoboken, NJ, 2014. (in Chinese in the National Defense Industry Press, 2018).
12. Dai, J., M. Ohadi, D. Das, and M. Pecht, *Optimum Cooling of Data Centers: Application of Risk Assessment & Mitigation Techniques*, Springer Science, 2013.
13. Chauhan, P., A. Choubey, Z. Zhong, and M. Pecht, *Copper Wire Bonding*, Springer-Verlag, New York, NY, 2013.
14. Pecht, M., R. Kaczmarek, X. Song, D. Hazelwood, R. Kavetsky, and D. Anand, *Rare Earth Materials: Insights and Concerns*, CALCE EPSC Press, University of Maryland, College Park, MD, 2012.
15. Bartels, B., U. Ermel, P. Sandborn, and M. Pecht, *Strategies to the Prediction, Mitigation, and Management of Product Obsolescence*, John Wiley, Hoboken, NJ, 2012.
16. Pecht, M., K. C. Kapur, R. Kang, and S. Zhang, *Foundations of Reliability Engineering* (*in Chinese*), Publishing House of Electronics Industry, China, 2011.
17. Short, J. M., R. A. Kavetsky, M. Pecht, and D. K. Anand, *Energetics Science & Technology in China*, CALCE EPSC Press, University of Maryland, College Park, MD, 2010.
18. Pecht, M. and R. Kang, *Diagnostics, Prognostics and System's Health Management* (*in Chinese*), City Univ. of Hong Kong, 2010.
19. Pecht, M., *China's Electronics Industry – The Definitive Guide for Companies and Policy Makers with Interests in China*, William Andrew Publishing, Norwich, NY, 2006; updated in 2010 with Len Zuga as co-author.
20. Ardebili, H. and M. Pecht, *Encapsulation Technologies for Electronic Applications, Materials and Processes for Electronic Applications Series*, Elsevier Press, New York, NY, 2009.
21. Pecht, M., *Product Reliability, Maintainability, and Supportability Handbook*, 2nd ed., CRC Press, Boca Raton, FL, 2009; 1st ed., 1995.
22. Pecht, M., *Prognostics and Health Management of Electronics*, John Wiley, New York, NY, 2008.
23. Ganesan S. and M. Pecht, *Lead-Free Electronics*, John Wiley, New York, NY, 2006.
24. Das, D., M. Pecht, and N. Pendse, *Rating and Uprating of Electronic Products*, CALCE EPSC Press, University of Maryland, College Park, MD, 2004.
25. Pecht, M., *Parts Selection and Management*, John Wiley, New York, NY, 2004.
26. Liu, W. and M. Pecht, *IC Component Sockets*, John Wiley, Hoboken, NJ, 2004.
27. Lee, S. B., M. Lee, and M. Pecht, *Korean Electronics Industry*, CALCE EPSC Press, University of Maryland, College Park, MD, 2004; update of Pecht M., J. Bernstein, M. Peckerar, and D. Searls, *The Korean Electronics Industry*, CRC Press, Boca Raton, FL, 1997.
28. Castelli, C., C. Nash, C. Ditlow, and M. Pecht, *Sudden Acceleration – The Myth of Driver Error*, CALCE Press, University of Maryland, College Park, MD, 2003.
29. Pecht, M., E. Bumiller, J. Pecht, and D. Douthit, *Contamination of Electronic Assemblies*, CRC Press, Boca Raton, FL, 2002.

30. Pecht, M., R. Solomon, P. Sandborn, C. Wilkinson, and D. Das, *Life Cycle Forecasting, Mitigation Assessment and Obsolescence Strategies*, CALCE EPSC Press, University of Maryland, College Park, MD, 2002.
31. Sharma, R., S. Parthasarathy, D. Bansal, and M. Pecht, *Indian Electronics Industry*, CALCE EPSC Press, University of Maryland, College Park, MD, 2002.
32. Nakayama, W., W. Boulton, and M. Pecht, *The Japanese Electronics Industry*, CRC Press, Boca Raton, FL, 1999. Now CRC Press e-Book, 2019.
33. Pecht, M., R. Radojcic, and G. Rao, *Guidebook for Managing Silicon Chip Reliability*, CRC Press, Boca Raton, FL, 1999.
34. Pecht, M., Chung-Shing Lee, Wang Yong Wen, Zong Xiang Fu, and Jian Jun Lu, *The Chinese Electronics Industry,* CRC Press, 1999.
35. Pecht, M., R. Agarwal, P. McCluskey, T. Dishongh, S. Javadpour, and R. Mahajan, *Electronic Packaging Materials and their Properties*, CRC Press, Boca Raton, FL, 1999.
36. Lall, P., Pecht, M., and E. Hakim, *The Influence of Temperature on Microelectronic Device Reliability*, CRC Press, Boca Raton, FL, 1997.
37. Lee, C. and M. Pecht, *The Taiwan Electronics Industry*, CRC Press, Boca Raton, FL, 1997.
38. Pecht, M., Beane, D., and A. Shukla, *The Singapore and Malaysia's Electronics Industries*, CRC Press, Boca Raton, FL, 1997.
39. Hannemann, R., Kraus, A., and M. Pecht, *Semiconductor Packaging – A Multidisciplinary Approach*, John Wiley, New York, NY, 1997.
40. Wong, Y. and M. Pecht, *Advanced Routing of Electronic Modules*, CRC Press, Boca Raton, FL, 1995.
41. Pecht, J. and M. Pecht, *Long-term Non-operating Reliability of Electronic Products*, CRC Press, Boca Raton, FL, 1995.
42. Pecht, M., Nguyen, L., and E. Hakim, *Plastic Encapsulated Microelectronics: Materials, Processes, Quality, Reliability, and Applications*, John Wiley, New York, NY, 1995.
43. Pecht M., *Integrated Circuit, Hybrid and Multichip Module Package Design Guidelines*, John Wiley, New York, NY, 1994.
44. Pecht, M., Dasgupta, A., Evans, J., and J. Evans, *Quality Conformance and Qualification of Electronic Packages*, John Wiley, New York, NY, 1994.
45. Pecht, M., *Placement and Routing of Electronic Modules*, Marcel Dekker, New York, NY, 1993.
46. Pecht, M., *Soldering Processes and Equipment*, John Wiley, New York, NY, 1993.
47. Pecht, M., *Handbook of Electronic Package Design*, Marcel Dekker, New York, NY, 1991.

Chapters in Books and Handbooks

1. Kirillov, A., S. Kirillov, V. Iakimkin, M. Pecht, and Y. Kaganovich, "Predicting Sets of Automata: Architecture, Evolution, Examples of Prognosis, and Applications," in *Fault Detection, Diagnosis and Prognosis*, F. P. G. Marquez (Ed.), IntechOpen, Feb. 2020.
2. Kirillov, A., S. Kirillov, V. Iakimkin, and M. Pecht, "Remote Computing Cluster for the Optimization of Preventive Maintenance Strategies: Models and Algorithms," in *Maintenance Management*, F. P. G. Marquez and M. Papaelis (Eds.), IntechOpen, Jan. 2020.
3. Campbell, P., Pecht, M., "Intellectual Property Protections in China," in *Intellectual Property Law of China-New Exploration of Intellectual Property with Chinese Characteristics,* X. Chen (Ed.), Encyclopedia of China Publishing House, China, 2018.
4. Su, Y., X. Song, T. Syrus, P. S. Chauhan, and M. Pecht, "Plastic Packaging of Microelectronic Devices," in *Reference Module in Materials Science and Materials Engineering*, S. Hashmi (Ed.), Elsevier, Oxford, UK, 2016.
5. Yan, S., X. Song, J. A. Scalise, and M. G. Pecht, "Electronic Packages: Quality and Reliability," in *Reference Module in Materials Science and Materials Engineering*, S. Hashmi (Ed.), Elsevier, Oxford, UK, 2016.
6. Hendricks, C., E. George, M. Osterman, and M. Pecht, "Physics-of-failure (PoF) Methodology for Electronics Reliability," in *Reliability Characterisation of Electrical and Electronic Systems*, J. Swingler (Ed.), Woodhead Publishing, Cambridge, UK, pp. 27–42, 2015.
7. Dai, J., M. M. Ohadi, and M. Pecht, "Energy Efficiency and Reliability Risk Mitigation of Data Centers through Prognostics and Health Management" in *Cooling of Microelectronic and Nanoelectronic Equipment*, M. Iyengar, K. Geisler, and B. Sammakia (Eds.), World Scientific, Singapore, pp. 357–375, 2014.
8. Campbell, P., and M. Pecht, "The Emperor's New Clothes: Intellectual Property Protections in China," in *Foreign Scholars Discuss Chinese Law (Series): Intellectual Property Law Chin*a, X. Chen (Ed.), Encyclopedia of China Publishing House, pp. 236–272, 2014.
9. Cheng, S., and M. Pecht, "Applications of Sensor Systems in Prognostics and Health Management," Chapter 16 in *Novel Advances in Microsystems Technologies and Their Applications*, L. Francis and K. Iniewski (Eds.), CRC Press, Boca Raton, FL, pp. 377–392, 2014.
10. Haddad, G., P. Sandborn, and M. Pecht, "Using Real Options to Valuate Decisions for Systems with Prognostic Capabalities," Chapter 3 in *Integrated Vehicle Health Management: Business Case Theory and Practice*, I. Jennions (Ed.), SAE International, Warrendale, PA, pp. 23–38, 2013.
11. Mathew, S., and M. Pecht, "IVHM System Design," Chapter 9 in *Integrated Vehicle Health Management: The Technology*, I. Jennions (Ed.), SAE International, Warrendale, PA, pp. 157–176, 2013.
12. Foote, P., C. Dibsdale, K. Jackson, R. Kumar, S. Raveendran, M. Azarian, and M. Pecht, "Prognostics and Health Management for Wind Turbines," Chapter 10 in *Integrated Vehicle Health Management: The Technology*, I. Jennions (Ed.), SAE International, Warrendale, PA, pp. 177–233, 2013.
13. Pecht, M., and M.-H. Chang, "Failure Mechanisms and Reliability Issues in LEDs," Chapter 3 in *Solid State Lighting Reliability: Components to Systems*, Springer Science, pp. 43–110, 2013.
14. Pecht, M., "Prognostics and Health Management," Chapter 14 in *Solid State Lighting Reliability: Components to Systems*, Springer Science, pp. 373–394, 2013.
15. Pecht, M., D. Das, and M.-H. Chang, "Introduction to LED Thermal Management and Reliability," Chapter 1 in *Thermal Management for LED Applications*, Springer Science + Business Media, pp. 3–14, 2013.
16. Cheng, S., and M. Pecht, "Applications of Sensor Systems in Prognostics and Health Management," Chapter 17 in *Novel Advances in Microsystems Technologies and their Applications*, L. Francis and K. Iniewski (Eds.), Taylor & Francis Books, pp. 397–412, 2013.
17. Sood, B., and M. Pecht, "Printed Circuit Board Laminates," in *Encyclopedia of Composites*, L. Nicolais and A. Borzacchiello (Eds.), John Wiley, pp. 2391–2401, 2012.
18. Yang, D., Y. C. Chan, and M. Pecht, "Electromigration in Flip-chip Solder Joints," in *Electromigration in Thin Films and Electronic Devices*, C.-U. Kim (Ed.), Woodhead Publishing, 2012.
19. Pecht, M., in *Diagnostics and Prognostics of Engineering Systems: Methods and Techniques*, IGI Global, 2012.
20. Haddad, G., P. A. Sandborn, T. Jazouli, M. Pecht, B. Foucher, and V. Rouet, "Guaranteeing High Availability of Wind Turbines," in *Advances in Safety, Reliability and Risk Management*, G. Berenguer and G. Soares (Eds.), CRC Press, pp. 461–469, 2012.
21. Rouet V., A. Delye, N. Vichare, M. Pecht, and B. Foucher, "Embedded Remaining Life Prognostics and Diagnostics of Electronics," *Smart Systems Integration and Reliability*, Honorary Vol., B. Michel and K. Lang (Eds.), Goldenbogen, pp. 606–613, 2010.
22. Stellrecht, E., B. T. Han, and M. Pecht, "Characterization of Hygroscopic Deformations by Moire Interferometry," Chapter 5 in *Moisture Sensitivity of Plastic Packages of IC Devices*, part of the series of Micro- and Opto-Electronic

Materials, Structures, and Systems, X. J. Fan and E. Suhir (Eds.), Springer Science + Business Media, New York, NY, pp. 113–130, 2010.
23. Pecht, M., "Reliability, Maintainability, and Availability," Chapter 8 in *Handbook of Systems Engineering and Management*, 2nd ed., John Wiley, pp. 361–395, 2009.
24. Rouet, V., A. Delye, N. Vichare, M. Pecht, and B. Foucher, "Embedded Remaining Life Prognostics and Diagnostics of Electronics," in *Micro Nano Reliability Handbook*, 2008.
25. Vichare, N., B. Tuchband, and M. Pecht, "Prognostic Health Management," Chapter 67 in *Handbook of Performability Engineerin*g, Springer, pp. 1107–1122, 2008.
26. Das, D., and M. Pecht, "Electronic Hardware Reliability," Chapter 20 in *RF and Microwave Handbook, RF and Microwave Applications and Systems*, 2nd ed., CRC Press, Boca Raton, FL, pp. 20-1–20-24, 2008.
27. Wang, W., Y. C. Chan, and M. Pecht, "Anisotropic Conductive Adhesives for Flip-chip Interconnections," in *Electrically Conductive Adhesives*, R. Gomatam and K. L. Mittal (Eds.), VSP, Leiden, The Netherlands, pp. 57–78, 2008.
28. Pecht, M., "Prognostics and Health Management of Electronics," Chapter 150 in *Encyclopedia of Structural Health Monitoring, Other Applications*, C. Boller, F. K. Chang, and Y. Fujino (Eds.), John Wiley, 2008.
29. Pecht, M., and Y. C. Chan, "Health Monitoring, Diagnostics, and Prognostics of Avionic Systems," *Encyclopedia of Structural Health Monitoring, Aerospace Applications*, C. Boller, F. K. Chang, and Y. Fujino (Eds.), John Wiley, 2008.
30. Pecht, M., "Lead-free Legislations, Exemptions, and Compliance," Chapter 4 in *Green Manufacturing Book Series: RoHS & WEEE - Status, Compliance, Issues and Implications*, Y. C. Chan (Ed.), pp. 65–105, Oct. 2006.
31. Middendorf, A., W. Grimm, O. Neb, N. Vichare, and M. Pecht, "Reliability of Electronic Systems as an Indispensable Condition for Sustainable Development," in *The World of Electronic Packaging and System Integration*, ddp goldenbogen, Dresden, Germany, pp. 367–374, 2004.
32. Liu C., M. Pecht, and Scalise J. A., "Electronic Packages: Quality and Reliability," in *Encyclopedia of Materials: Science and Technolog*y, Elsevier, pp. 2644–2654, 2001.
33. Syrus T., and M. Pecht, "Plastic Packaging of Microelectronic Devices," in *Encyclopedia of Materials: Science and Technology*, Elsevier, pp. 5610–5616, 2001.
34. Pecht, M., P. McCluskey, and J. Y. Evans, "Failures in Electronic Assemblies and Devices," Chapter 8 in *Product Integrity and Reliability in Design*, Evans, J. W., and J. Y. Evans (Eds.), Springer-Verlag London Limited, pp. 204–232, 2001.
35. Pecht, M., and I. Bordelon, "Electronic Hardware Reliability," in *Electronic Systems Maintenance Handbook*, J. C. Whitaker (Ed.), CRC Press, Boca Raton, FL, pp. 2.1–2.12, Dec. 2001.
36. Pecht, M., and P. McCluskey, "Failure Analysis of Assemblies and Devices," Chapter 13 in *Product Integrity and Reliability in Design*, J. W. Evans, and J. Y. Evans (Eds.), Springer-Verlag London, pp. 338–369, 2001.
37. Vichare, N., P. Zhao, D. Das, and M. Pecht, "Electronic Hardware Reliability," Chapter 4 in *Avionics: Elements, Software and Functions*, Taylor & Francis, CRC, Routledge, FL, pp. 4-1–4-22, 2006; update of Ramakrishnan, A., T. Syrus, and M. Pecht, "Electronic Hardware Reliability," in *Avionics Handbook*, CRC Press, Boca Raton, FL, pp. 22.1–22.21, Dec. 2000.
38. Ramakrishnan, A., T. Syrus, and M. Pecht, "Electronic Hardware Reliability," in *RF and Microwave Handbook*, J. M. Golio (Ed.), CRC Press, Boca Raton, FL, pp. 3.102–3.121, Dec. 2000.
39. M. Pecht, "Reliability, Maintainability, and Availability," in *Handbook of Systems Engineering and Management*, John Wiley, New York, NY, pp. 303–326, April 1999.
40. Pecht, M., and A. Prabhu, "Packaging (Electronic Materials)," in *The Concise Encyclopedia of Chemical Technology*, 4th ed., Vol. 17, Wiley Interscience, New York, NY, pp. 1440–1441, 1999.
41. Pecht et al. "Engineering Design," in *The CRC Handbook of Mechanical Engineering*, F. Kreith (Ed.), CRC Press, Boca Raton, FL, pp. 11.22–11.36, 1997.
42. Pecht, M., and L. Nguyen, "Plastic Packaging," Vol. 2, in *Microelectronics Packaging Handbook, Semiconductor Packaging*, 2nd ed., R. Tummala, E. Rymaszewski, and A. Klopfenstein (Eds.), Chapman & Hall, New York, NY, pp. 394–508, 1997.
43. M. Pecht, "Plastic Encapsulated Microcircuits," in *Reliability, Maintainability, and Supportability Guidebook* - Third Edition SAE Int'l RMS Committee (G-11), Society of Automotive Engineers, 1997.
44. Pecht, M., P. Lall, and E. Hakim, "Temperature as a Reliability Factor," in *Thermal Management of Electronic System II*, E. Beyne, C. Lasance, and J. Berghmans (Eds.), Kluwer Academic Publishers, pp. 1–20, 1997.
45. Pecht, M., and I. Bordelon, "Electronic Hardware Reliability," Chapter 137, Section XXI in *The Electronics Handbook*, J. C. Whitaker (Ed.), CRC Press, Boca Raton, FL, pp. 2160–2170, 1996.
46. Pecht, M., D. Burkus, and S. Bhagath, "Electronics Assembly," Chapter 22 in *Handbook of Manufacturing Engineering*, Marcel Dekker, New York, NY, pp. 1027–1092, 1996.
47. Pecht, M., and A. Prabhu, "Electronic Materials," in *Encyclopedia of Chemical Technology*, 4th ed., Vol. 17, pp. 1024–1048, J. Kroschwitz (Ed.), John Wiley, New York, NY, 1995.

48. Pecht, M., and P. Lall, "Temperature Dependencies on Electromigration," Chapter 3 in *Electromigration and Electronic Device Degradation*, A. Christou (Ed.), Wiley Interscience, New York, NY, pp. 79–104, 1994.
49. Pecht, M., and P. Lall, "Mechanics of Wirebond Interconnects," Chapter 22 in *Thermal Stress and Strain in Microelectronics Packaging*, J. Lau (Ed.), Van Nostrand Reinhold, New York, NY, pp. 729–802, 1993.
50. Pecht, M., P. Lall, G. Ballou, C. Sankaran, and N. Angelopoulos, "Passive Components," in *The Electrical Engineering Handbook*, 2nd ed., R. Dorf (Ed.), CRC Press, Boca Raton, FL, pp. 5–44, 1997. Update of Pecht, M. and P. Lall, "Resistors," Section 1.1, in *The Electrical Engineering Handbook*, R. Dorf (Ed.), CRC Press, Boca Raton, FL, pp. 5–15, 1993.
51. Pecht, M. and P. Lall, "Resistors," Section 1.1, pp. 5–15, *in The Electrical Engineering Handbook*, R. Dorf (Ed.), CRC Press, Boca Raton, FL, 1993.
52. Shan, X., and M. Pecht, "Corrosion in Microelectronics Packages," Chapter 23 in *Thermal Stress and Strain in Microelectronics Packaging*, J. Lau (Ed.), Van Nostrand Reinhold, New York, NY, pp. 803–849, 1993.
53. Pecht, M., P. Lall, and E. Hakim, "Temperature Dependence of Integrated Circuit Failure Mechanisms," Chapter 2 in *Advances in Thermal Modeling III*, A. Bar-Cohen and A. Kraus (Eds.), IEEE Press, New York, NY, pp. 61–152, 1992.
54. Pecht, M., and P. Lall, "General Reliability Considerations as Applied to MMICs," Chapter 2 in *Reliability of Gallium Arsenide MMIC*s, A. Christou (Ed.), John Wiley, New York, NY, pp. 41–58, 1992.
55. Christou, A., A. Dasgupta, M. Pecht, and D. Barker, "Reliability Considerations for MMIC Packages," Chapter 11 in *Reliability of Gallium Arsenide MMICs*, A. Christou (Ed.), John Wiley, New York, NY, pp. 411–434, 1992.

Articles

1. Zhou He, Daeil Kwon, and Michael Pecht, "Evaluation of IEC 60529 as a Standard for Liquid Protection Assessment of Portable Electronics", *Scientific Reports, Nature*, 2023.
2. H. Rauf, M. Khalid, N. Arshad and M. Pecht, "Novel Feature Selection Strategy for Cyclic Loss Prediction of Lithium-ion Electric Vehicle Battery," *2023 IEEE Power & Energy Society General Meeting (PESGM)*, Orlando, FL, USA, 2023, pp. 1-6, doi: 10.1109/PESGM52003.2023.10253190.
3. Siyu Zhang, Lei Su, Jiefei Gu, Ke Li, Weitian Wu, Michael Pecht, "Category-level selective dual-adversarial network using significance-augmented unsupervised domain adaptation for surface defect detection", *Expert Systems with Applications,* Volume 238, Part B, 2024, 121879, ISSN 0957-4174, https://doi.org/10.1016/j.eswa.2023.121879.
4. M. O. Tarar, N. U. Hassan, I. H. Naqvi and M. Pecht, "Techno-Economic Framework for Electric Vehicle Battery Swapping Stations," in *IEEE Transactions on Transportation Electrification*, vol. 9, no. 3, pp. 4458-4473, Sept. 2023, doi: 10.1109/TTE.2023.3252169.
5. Lingxi Kong and Michael G. Pecht, *"*A Case Study into a Battery Company and Their 18650 Batteries*", e-Prime -Advances in Electrical Engineering, Electronics and Energy* (2023), doi:https://doi.org/10.1016/j.prime.2023.100294
6. Niranjanmurthi Lingappan, Wonoh Lee, Stefano Passerini, Michael Pecht, A comprehensive review of separator membranes in lithium-ion batteries, *Renewable and Sustainable Energy Reviews*, Volume 187, 2023, 113726, ISSN 1364-0321, https://doi.org/10.1016/j.rser.2023.113726.
7. Quanqing Yu, Yuwei Nie, Simin Peng*, Yifan Miao, Chengzhi Zhai, Runfeng Zhang, Jinsong Han, Shuo Zhao, Michael Pecht, "Evaluation of the Safety Standards System of Power Batteries for Electric Vehicles in China" [J]，*Applied energy*, 2023
8. M. Kohani, J. Meiguni, D. J. Pommerenke and M. G. Pecht, "ESD Events to Wearable Medical Devices in Healthcare Environments—Part 1: Current Measurements," in *IEEE Transactions on Electromagnetic Compatibility*, vol. 65, no. 4, pp. 954-959, Aug. 2023, doi: 10.1109/TEMC.2023.3272656.
9. Simin Peng，Ao Zhang, DanDan Liu, Mengzeng Cheng, Jiarong Kan, Michael Pecht*. "State of charge estimation of lithium-ion batteries based on double-coefficient tracking improved square-root unscented Kalman filter" [J]，*Batteries,* 2023
10. Simin Peng, Liyang Zhu, Zhenlan Dou, Dandan Liu, Ruixin Yang, Michael Pecht*. "Method of Site Selection and Capacity Setting for Battery Energy Storage System in Distribution Networks with Renewable Energy Sources" [J]. *Energies*，2023，16（9），3899
11. H. Ali, H. A. Khan, and M. Pecht, "Evaluation of in-service smartphone battery drainage profile for video calling feature in major apps," *Scientific Reports*, vol. 13, no. 1, p. 11699, 2023/07/20 2023, doi: 10.1038/s41598-023-38859-3.
12. S. Woo, D. L. O'Neal, and M. Pecht, "Improving the lifetime of mechanical systems during transit established on quantum/transport life-stress prototype and sample size," *Mechanical Systems and Signal Processing*, vol. 193, pp. 110222, 2023. doi: 10.1016/j.ymssp. 2023.110222.
13. Y. Sun, L. Su, J. Gu, K. Li and Michael Pecht, "A Novel 3-Probability Spaces Logic Decoupling Distillation for Flip-Chip Defect Detection," *IEEE Transactions on Instrumentation and Measurement*, 2023, doi: 10.1109/TIM.2023.3284130.
14. Aihua Tang, Yihan Jiang, Yuwei Nie, Quanqing Yu, Weixiang Shen, Michael Pecht, "Health and lifespan prediction considering degradation patterns of lithium-ion batteries based on transferable attention neural network", *Energy*, Volume 279, 2023, 128137, ISSN 0360-5442, https://doi.org/10.1016/j.energy.2023.128137.
15. D. Wang, S. Wang, D. Kong, J. Wang, W. Li and M. Pecht, "Physics-Informed Sparse Neural Network for Permanent Magnet Eddy Current Device Modelling and Analysis," *IEEE Magnetics Letters*, 2023, doi: 10.1109/LMAG.2023.3288388.
16. Quanqing Yu, Can Wang, Jianming Li, Rui Xiong, Michael Pecht, "Challenges and outlook for lithium-ion battery fault diagnosis methods from the laboratory to real world applications", *eTransportation,* Volume 17, 2023, 100254, ISSN 2590-1168, https://doi.org/10.1016/j.etran.2023.100254.
17. Hao Lyu, Hongchen Qu, Hualong Xie, Yimin Zhang, Michael Pecht, "Reliability analysis of the multi-state system with nonlinear degradation model under Markov environment", *Reliability Engineering and System Safety* (2023), doi: https://doi.org/10.1016/j.ress. 2023.109411

18. Mohamed Arezki Mellal, Enrico Zio, Michael Pecht, "Multi-objective reliability and cost optimization of fuel cell vehicle system with fuzzy feasibility", *Information Sciences*, 2023, 119112, ISSN 0020-0255, https://doi.org/10.1016/j.ins.2023.119112.
19. Peng, S.; Zhu, L.; Dou, Z.; Liu, D.; Yang, R.; Pecht, M., "Method of Site Selection and Capacity Setting for Battery Energy Storage System in Distribution Networks with Renewable Energy Sources". *Energies,* 2023, 16, 3899. https://doi.org/10.3390/en16093899
20. Declan P Mallamo, Michael H Azarian, and Michael Pecht, Interpretable Fault Prognostics for Switch Mode Power Supplies, *IEEE Green Technologies Conference*, Colorado, USA, April 19 – 21, 2023
21. M. O. Tarar, N. U. Hassan, I. H. Naqvi, and M. Pecht, "Techno-Economic Framework for Electric Vehicle Battery Swapping Stations," *IEEE Transactions on Transportation Electrification*. doi: 10.1109/TTE.2023.3252169.
22. H. Ali, H. Beltran, N. J. Lindsey, and M. Pecht, "Assessment of the Calendar Aging of Lithium-Ion Batteries for a Long-term-Space Missions," *Frontiers in Energy Research*, vol. 11, no. 1108269, Feb. 2023. doi: 10.3389/fenrg.2023.1108269.
23. L. Su, S. Tan, Y. Qi, J. Gu, Y. Ji, G. Wang, X. Ming, K. Li, and M. Pecht, "An Improved Orthogonal Matching Pursuit Method for Denoising High-frequency Ultrasonic Detection Signals of Flip Chips," *Mechanical Systems and Signal Processing*, vol. 188, pp. 110030, 2023. doi: 10.1016/j.ymssp.2022.110030.
24. S. Peng, L. Zhu, Z. Dou, D. Liu, Q. Yu, and M. Pecht, "Method of site selection and capacity setting for battery energy storage system in distribution networks with renewable energy sources," *Energy Reports*, vol. 9, 2023. doi: 10.1016/j.egyr.2022.12.028.
25. H. Beltran, E. Sansano, and M. Pecht, "Machine learning techniques suitability to estimate the retained capacity in lithium-ion batteries from partial charge/discharge curves," *Journal of Energy Storage*, vol. 59, pp. 621-626, 2023. doi: 10.1016/j.est.2022.106346.
26. E. Sansano and M. Pecht, "Machine learning techniques suitability to estimate the retained capacity in lithium-ion batteries from partial charge/discharge curves," *Elsevier: Journal of Energy Storage*, vol 59, 2023. 106346, ISSN 2352-152X, https://doi.org/10.1016/j.est.2022.106346.
27. X. Y. Yao, G. Chen, L. Hu, and M. Pecht, "A multi-model feature fusion model for lithium-ion battery state of health prediction," Journal *of Energy Storage*, vol. 56, part B, 2022. 106051, ISSN 2352-152X, doi:/10.1016/j.est.2022.106051.
28. T. Shibutani and M. Pecht, "Anomaly detection of servomotors subject to highly accelerated limit testing," *International Journal of Prognostics and Health Management,* Aug. 2022. https://doi.org/10.36001/ijphm.2022.v13i2.3138
29. H. Lyu, H. Qu, Z. Yang, L. Ma, B. Lu, and M. Pecht, "Reliability analysis of dependent competing failure processes with time-varying δ shock model," *Reliability Engineering & System Safety*, 2022. 108876, ISSN 0951-8320, https://doi.org/10.1016/j.ress.2022.108876.
30. W. Diao, J. Kim, M. H. Azarian, and M. Pecht, "Degradation modes and mechanisms analysis of lithium-ion batteries with knee points," *Electrochimica Acta,* vol. 431, 2022. 141143, ISSN 0013-4686, https://doi.org/10.1016/j.electacta.2022.141143.
31. V. Khemani, M. H. Azarian, and M. Pecht, "Efficient identification of jiles–atherton model parameters using space-filling designs and genetic algorithms," *Eng*, 2022, 364 – 372. https://www.mdpi.com/2673-4117/3/3/26, 2673-4117,doi:10.3390/eng3030026
32. L. Kong, R. Aalund, M. Alipour, S. I. Stoliarov, and M. Pecht, "Evaluating the manufacturing quality of lithium ion pouch batteries," *Journal of The Electrochemical Society,* 169, no. 4 (2022). 040541. DOI: 10.1149/ 1945-7111/ac6539
33. H. Ali, H. A. Khan, and M. Pecht, "Preprocessing of spent lithium-ion batteries for recycling: need, methods, and trends," *Renewable and Sustainable Energy Reviews,* vol. 168, 2022. 112809, ISSN 1364-0321, https://doi.org/10.1016/j.rser.2022.112809.
34. C. Hendricks, B. Sood, and M. Pecht, "Lithium-ion battery strain gauge monitoring and depth of discharge estimation," *J. Electrochemical Energy Conversion and Storage,* 20(1) (2022), p. 011008. https://doi.org/10.1115/1.4054340
35. S. Wang, D. Wang, D. Kong, W. Li, H. Wang, and M. Pecht, "Cross-level fusion for rotating machinery fault diagnosis under compound variable working conditions," *Measurement*, vol 199, Aug. 2022. 111455, ISSN 0263-2241, https://doi.org/10.1016/j.measurement.2022.111455.
36. H. Walvekar, H. Beltran, S. Sripad, and M. Pecht, "Implications of the electric vehicle manufacturers' decision to mass adopt lithium-iron phosphate batteries," *IEEE Access*, 2022. doi: 10.1109/ACCESS.2022.3182726

37. X. Hu, X. Deng, F. Wand, Z. Deng, X. Lin, R. Teodorescu, and M. Pecht, "A review of second-life lithium-ion batteries for stationary energy storage applications," *IEEE,* vol. 110, no. 6, pp. 735-753, June 2022. doi: 10.1109/JPROC.2022.3175614.
38. L. Kong, D. Das, and M. Pecht, "The distribution and detection issues of counterfeit lithium-ion batteries," *Energies* 15, no. 10: 3798. https://doi.org/10.3390/en15103798
39. R. Chaudhary, L. Kaushik, M. H. Azarian, and M. Pecht, "Comparison *Between Synthetic Oil Lubricants for Reducing Fretting Degradation in Lightly Loaded Gold-Plated Contacts*," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, vol. 12, no. 4, pp. 616-626, April 2022. DOI: 10.1109/TCPMT.2022.3159572.
40. Y. Zhao, X. He, D. Zhou, and M. Pecht, "Detection and isolation of wheelset intermittent over-creeps for electric multiple units based on a weighted moving average technique," *IEEE Transactions on Intelligent Transportation Systems*, 23(4), pp. 3392-3405, Apr. 2022. DOI: 10.1109/TITS.2020.3036102.
41. Z. Wu, H. Zhang, J. Guo, Y. Ji, and M. Pecht, "Imbalanced bearing fault diagnosis under variant working conditions using cost-sensitive deep domain adaptation network," *Expert Systems with Applications*, 193, 116459, 2022. DOI: 10.1016/j.eswa.2021.116459.
42. R. Aalund, B. Endreddy, and M. Pecht, "how gas generates in pouch cells and affects consumer products," *Frontiers in Chemical Engineering*, 2022. doi: 10.3389/fceng.2022.828375
43. V. Khemani, M. H. Azarian, and M. Pecht, "Learnable wavelet scattering networks: applications to fault diagnosis of analog circuits and rotating machinery," *Electronics,* 11(3), 451. doi: 10.3390/electronics11030451
44. S. Amir, M. Gulzar, M. O. Tarar, I. H. Naqvi, N. A. Zaffar, and M. Pecht, "Dynamic equivalent circuit model to estimate state-of-health of lithium-ion batteries," *IEEE Access*, vol. 10, pp 18279-18288, 2022. doi: 10.1109/ACCESS.2022.3148528.
45. H. Lyu, Z. Yang, S. Wang, Y. Zhao, and M. Pecht, "Reliability Modeling for Multistage Systems Subject to Competing Failure Processes," *Quality and Reliability Engineering International*, vol. 37, no. 6, pp. 2936-2949, 2021, doi: 10.1002/qre.2898.
46. B. İlknur, A. Fortier, S. Kyeong, R. Ambat, H. C. Gudla, M. H. Azarian, and M. Pecht, "The Detrimental Effects of Water on Electronic Devices," *e-Prime - Advances in Electrical Engineering, Electronics and Energy*, 2021. DOI: 10.1016/j.prime.2021.100016
47. H. Yu, J. Li, Y. Ji, and M. Pecht, "Life-cycle Parameter Identification Method of an Electrochemical Model for Lithium-ion Battery Pack," *Journal of Energy Storage*, vol. 42, p. 103591, 2021. https://doi.org/10.1016/j.est.2021.103591.
48. E. Elbrum and M. Pecht, "Commercial Hard Drive Failures in a Data Center Application and the Role of SMART Attribute Information," *Circuit World*, Vol. 47 No. 4, pp. 408-426, 2021. https://doi.org/10.1108/CW-07-2020-0127
49. She, D., M. Jia, and M. Pecht (2021). Weighted Entropy Minimization Based Deep Conditional Adversarial Diagnosis Approach Under Variable Working Conditions. *IEEE/ASME Transactions on Mechatronics*, *26*(5), 2440-2450. DOI: 10.1109/tmech.2020.3040175
50. Zhang, Bin; Tang Liu, Bin Zhang, and Michael Pecht. (2021). Recent Development of Unpowered Exoskeletons for Lower Extremity: A Survey. *IEEE Access*, 9, 138042-138056. DOI: 10.1109/access.2021.3115956
51. Hoque, Mohammad A., Petteri Nurmi, Arjun Kumar, Samu Varjonen, Junehwa Song, Michael G. Pecht, and Sasu Tarkoma, "Data Driven Analysis of Lithium-ion Battery Internal Resistance Towards Reliable State of Health Prediction", *Journal of Power Sources*, 513 (2021) 230519
52. Diao, W., Kulkarni, C., and Pecht, M. (2021). Development of an Informative Lithium-Ion Battery Datasheet. *Energies*, *14*(17), 5434. https://doi.org/10.3390/en14175434
53. Xu, B., Kwon, D., Lee, J., Kong, L., and Pecht, M., "Mitigation Strategies for Li-ion Battery Thermal Runaway: A Review", *Renewable and Sustainable Energy Reviews*, vol. 150, p. 111437, 2021. DOI: 10.1016/j.rser.2021.111437
54. Su, L., Yu, X., Li, K., Gu, J., and Pecht, M., "Sparse Reconstruction for Microdefect Detection of Two-Dimensional Ultrasound Image Based on Blind Estimation," *IEEE Transactions on Industrial Electronics*, vol. 68, no. 10, pp. 10154-10161, Oct. 2021, DOI: 10.1109/TIE.2020.3021651

55. Jia, Z., Liu, Z., Gan, Y., Vong, C. M., and Pecht, M., "A Deep Forest-Based Fault Diagnosis Scheme for Electronics-Rich Analog Circuit Systems," in *IEEE Transactions on Industrial Electronics*, vol. 68, no. 10, pp. 10087-10096, Oct. 2021, DOI: 10.1109/TIE.2020.3020252
56. Li, J., Zhao, M., Dai, C., Wang, Zhenbo and Pecht, M., "A Mathematical Method for Open-circuit Potential Curve Acquisition for Lithium-ion Batteries", *Journal of Electroanalytical Chemistry*, p. 115488, 2021. DOI: 10.1016/j.jelechem.2021.115488
57. Aalund, R., Diao, W., Kong, L., and Pecht, M. "Understanding the Non-Collision Related Battery Safety Risks in Electric Vehicles a Case Study in Electric Vehicle Recalls and the LG Chem Battery," *IEEE Access*, vol. 9, pp. 89527-89532, 2021, DOI: 10.1109/ACCESS.2021.3090304.
58. Roman, D., Saxena, S., Robu, V., Pecht, M., and Flynn D., "Machine learning pipeline for battery state-of-health estimation", *Nature Machine Intelligence*, vol. 3, no. 5, pp. 447-456, 2021. DOI: 10.1038/s42256-021-00312-3.
59. Lingappan, N., L. Kong, and M. Pecht, "The Significance of Aqueous Binders in Lithium-ion Batteries", *Renewable and Sustainable Energy Reviews*, vol. 147, p. 111227, 2021. Available: 10.1016/j.rser.2021.111227.
60. Williard, N., Hendricks, C., Chung, J., and Pecht, M., "Effects of External Pressure on Phase Stability and Diffusion Rate in Lithium-Ion Cells", *Journal of Electroanalytical Chemistry*, p. 115400, 2021. DOI: 10.1016/j.jelechem.2021.115400
61. Hayder Ali, Hassan A. Khan, M. Pecht, "Circular Economy of Li-Batteries: Technologies and Trends", *Journal of Energy Storage,* Volume 40, 2021, 102690, ISSN 2352-152X, https://doi.org/10.1016/j.est.2021.102690.
62. Zang, Y., Shangguan, W., Cai, B., Wang, H. and Pecht, M. G., "Hybrid remaining useful life prediction method. A case study on railway D-cables", *Reliability Engineering & System Safety*, vol. 213, p. 107746, 2021. Available: 10.1016/j.ress.2021.107746.
63. B. Xu, L. Kong, G. Wen and M. Pecht, "Protection Devices in Commercial 18650 Lithium-Ion Batteries", *IEEE Access*, vol. 9, pp. 66687-66695, 2021. Available: 10.1109/access.2021.3075972.
64. H. Lyu, X. Zhang, Z. Yang, S. Wang, C. Li and M. Pecht, "Reliability Analysis for the Dependent Competing Failure with Wear Model and Its Application to the Turbine and Worm System", *IEEE Access*, Vol. 9, pp. 50265–50280, 2021. Available: 10.1109/access.2021.3062026.
65. T. Dong, Y. Gu, T. Liu and M. Pecht, "Resistive and capacitive strain sensors based on customized compliant electrode: Comparison and their wearable applications", *Sensors and Actuators A: Physical*, vol. 326, p. 112720, 2021. Available: 10.1016/j.sna.2021.112720.
66. Zhang, Lei; Xiaosong Hu; Zhenpo Wang; Jiageng Ruan; Chengbin Ma; Ziyou Song; David G. Dorrell; Michael Pecht, "Hybrid electrochemical energy storage systems: An overview for smart grid and electrified vehicle applications", *Renewable and Sustainable Energy - Elsevier*, Vol. 139, April 2021, 110581
67. S. Seckin Erol, Michael Pecht, Condition Monitoring of a Worm-Type Gearbox in Terms of Tribo-Prognostics Through Vibro-Thermal Analysis, *Proceedings of the Romanian Academy*, Vol. 22, pp. 83–90, 2021
68. Wang, Yuahi; Junfu Li; Jingming Zhang; Michael Pecht, "Lithium-iron-phosphate battery electrochemical modelling under a wide range of ambient temperatures", *Journal of Electroanalytical Chemistry, Elsevier,* 882,115041, 2021.
69. Zhang, Siyu; Zhang, Quiju; Gu, Jiefei; Su, Lei; Li, Ke; Pecht, M., "Visual Inspection of Steel Surface Defects Based on Domain Adaptation and Adaptive Convolutional Neural Network", *Mechanical Systems and Signal Processing Journal - Elsevier,* Volume 153, May 2021.
70. Che, Y., Foley, A., El-Gindy, M., Lin, X., Hu, X., and Pecht, M. (2021). Joint estimation of inconsistency and state of health for series battery packs. *Automotive Innovation*, *4*(1), 103-116.
71. Menon, Sandeep; Deng Yun Chen; Michael Osterman; Michael Pecht, "Copper Trace Fatigue Life Modeling for Rigid Electronic Assemblies", *IEEE Transactions on Device and Materials Reliability*, 2021, DOI 10.1109/TDMR.2021.3055432
72. Saxena, S.; Roman, D.; Robu, V.; Flynn, D.; Pecht, M., "Battery Stress Factor Ranking for Accelerated Degradation Test Planning Using Machine Learning". *Energies 14*, 723, 2021. https://doi.org/10.3390/en14030723
73. C. Cheng, Y. Hu, J. Wang, H. Liu and M. Pecht, "Generalized sparse filtering for rotating machinery fault diagnosis", The Journal of Supercomputing, vol. 77, no. 4, pp. 3402-3421, 2020. Available: 10.1007/s11227-020-03398-5.
74. H. Abadi, Z. He and M. Pecht, "Artificial Intelligence-Related Research Funding by the U.S. National Science Foundation and the National Natural Science Foundation of China", IEEE Access, vol. 8, pp. 183448-183459, 2020. Available: 10.1109/access.2020.3029231.

75. R. Patil, B. Kothavale, L. Waghmode and M. Pecht, "Life cycle cost analysis of a computerized numerical control machine tool: a case study from Indian manufacturing industry", Journal of Quality in Maintenance Engineering, vol. 27, no. 1, pp. 107-128, 2020. Available: 10.1108/jqme-07-2019-0069.
76. 11. H. Huang, K. Li, W. Su, J. Bai, Z. Xue, L. Zhou, L. Su and M. Pecht, "An improved empirical wavelet transform method for rolling bearing fault diagnosis", Science China Technological Sciences, vol. 63, no. 11, pp. 2231-2240, 2020. Available: 10.1007/s11431-019-1522-1.
77. W. Diao, I. H. Naqvi, and M. Pecht, "Early detection of anomalous degradation behavior in lithium-ion batteries," J. Energy Storage, vol. 32, p. 101710, Dec. 2020.
78. N. Lee, M. Azarian, and M. Pecht, "Octave-band Filtering for Convolutional Neural Network-based Diagnostics for Rotating Machinery", PHM Conference, vol. 12, no. 1, p. 9, Nov. 2020.
79. H. Dai, B. Jiang, X. Hu, X. Lin, X. Wei, and M. Pecht, "Advanced battery management strategies for a sustainable energy future: Multilayer design concepts and research trends," Renewable and Sustainable Energy Reviews. Elsevier Ltd, p. 110480, 29-Oct-2020.
80. Jiankun Liu, Guanpeng Liu, Hua Ouyang, Yulong Li, Ming Yan, and Michael Pecht, Wetting Kinetics and Microstructure Analysis of BNi2 Filler Metal over Selective Laser Melted Ti-6Al-4V Substrate, Materials 2020, 13, 4666; doi:10.3390/ma13204666, Oct. 2020
81. Li, Junfu, Dafang Wang, Lei Deng, Zhiquan Cui, Chao Lyu, Lixin Wang, and Michael Pecht. "Aging modes analysis and physical parameter identification based on a simplified electrochemical model for lithium-ion batteries." *Journal of Energy Storage* 31 (2020): 101538.
82. M. A. Mellal and M. Pecht, "A multi-objective design optimization framework for wind turbines under altitude consideration," Energy Convers. Manag., vol. 222, p. 113212, Oct. 2020.
83. L. Su, X. Yu, K. Li, J. Gu, and M. Pecht, "Sparse Reconstruction for Micro-defect Detection of Two-dimensional Ultrasound Image Based on Blind Estimation," IEEE Trans. Ind. Electron., pp. 1–1, Sep. 2020.
84. J. Romero, M. H. Azarian, and M. Pecht, "Reliability analysis of multilayer polymer aluminum electrolytic capacitors," Microelectron. Reliab., vol. 112, Sep. 2020.
85. Z. Jia, Z. Liu, Y. Gan, C. M. Vong, and M. Pecht, "A Deep Forest Based Fault Diagnosis Scheme for Electronics-Rich Analog Circuit Systems," IEEE Trans. Ind. Electron., pp. 1–1, Sep. 2020.
86. W. Du, S. Wang, X. Gong, H. Wang, X. Yao, and M. Pecht, "Translation Invariance-Based Deep Learning for Rotating Machinery Diagnosis," Shock Vib., vol. 2020, Aug. 2020.
87. S. Saxena and M. Pecht, "X-ray based non-destructive method for alkaline coin cell quality assurance," J. Energy Storage, vol. 30, p. 101476, Aug. 2020.
88. Y. Zhao, X. He, M. G. Pecht, J. Zhang, and D. Zhou, "Detection and detectability of intermittent faults based on moving average T2 control charts with multiple window lengths," J. Process Control, vol. 92, pp. 296–309, Aug. 2020.
89. D. She, M. Jia, and M. G. Pecht, "Sparse auto-encoder with regularization method for health indicator construction and remaining useful life prediction of rolling bearing," Meas. Sci. Technol., vol. 31, no. 10, p. 13, Jul. 2020.
90. C. M. Huang, A. Raj, M. Osterman, and M. Pecht, "Assembly Options and Challenges for Electronic Products with Lead-Free Exemption," IEEE Access, vol. 8, pp. 134194–134208, Jul. 2020.
91. K. Wang, H. Guo, A. Xu, and M. Pecht, "Degradation monitoring of insulation systems used in low-voltage electromagnetic coils under thermal loading conditions from a creep point of view," Sensors (Switzerland), vol. 20, no. 13, pp. 1–20, Jul. 2020.
92. M. Zhao, S. Zhong, X. Fu, B. Tang, and M. Pecht, "Deep Residual Shrinkage Networks for Fault Diagnosis," IEEE Trans. Ind. Informatics, vol. 16, no. 7, pp. 4681–4690, Jul. 2020.
93. L. Su, X. Yu, K. Li, and M. Pecht, "Defect inspection of flip chip solder joints based on non-destructive methods: A review," Microelectronics Reliability, vol. 110. Elsevier Ltd, p. 113657, 01-Jul-2020.
94. N. J. Jameson, M. H. Azarian, and M. Pecht, "Improved electromagnetic coil insulation health monitoring using equivalent circuit model analysis," Int. J. Electr. Power Energy Syst., vol. 119, p. 105829, Jul. 2020.
95. G. Pandian, M. Pecht, E. Zio, and M. Hodkiewicz, "Data-driven Reliability Analysis of Boeing 787 Dreamliner," Chinese J. Aeronaut., vol. 33, no. 7, pp. 1969–1979, Jul. 2020.
96. W. Shangguan, Y. Zang, H. Wang, and M. G. Pecht, "Board-Level Lifetime Prediction for Power Board of Balise Transmission Module in High-Speed Railways," IEEE Access, vol. 8, pp. 135011–135024, Jul. 2020.
97. D. She, N. Peng, M. Jia, and M. G. Pecht, "Wasserstein distance based deep multi-feature adversarial transfer diagnosis approach under variable working conditions," J. Instrum., vol. 15, no. 6, p. P06002, Jun. 2020.

98. H. Liu, I. Naqvi, F. Li, C. Liu, N. Shafiei, Y. Li, and M. Pecht, “An analytical model for the CC-CV charge of Li-ion batteries with application to degradation analysis,” J. Energy Storage, vol. 29, Jun. 2020.
99. J. M. Twomey, D. Y. Chen, M. D. Osterman, and M. G. Pecht, “Development of a cycle counting algorithm with temporal parameters,” Microelectron. Reliab., vol. 109, Jun. 2020.
100. C. Cheng, W. Wang, H. Liu, and M. Pecht, “Intelligent fault diagnosis using an unsupervised sparse feature learning method,” Meas. Sci. Technol., vol. 31, no. 9, pp. 95903–95913, Jun. 2020.
101. Y. Zhao, X. He, D. Zhou and M. Pecht, "Detection and Isolation of Wheelset Intermittent Over-Creeps for Electric Multiple Units Based on a Weighted Moving Average Technique", IEEE Transactions on Intelligent Transportation Systems, pp. 1-14, 2020. Available: 10.1109/tits.2020.3036102.
102. X. Y. Yao, L. Kong, and M. G. Pecht, “Reliability of Cylindrical Li-ion Battery Safety Vents,” *IEEE Access*, vol. 8, pp. 101859–101866, May 2020.
103. H. Habibollahi Najaf Abadi and M. Pecht, “Artificial intelligence trends based on the patents granted by the united states patent and trademark office,” *IEEE Access*, vol. 8, pp. 81633–81643, May 2020.
104. L. Kong, X. Hu, G. Gui, Y. Su, and M. Pecht, “Computed Tomography Analysis of Li-Ion Battery Case Ruptures,” Fire Technol., pp. 1–14, May 2020.
105. M. Kohani et al., “Electrostatic Charging of a Human Body Caused by Activities and Material Combinations in Hospitals,” IEEE Trans. Electromagn. Compat., vol. 62, no. 2, pp. 315–323, Apr. 2020.
106. H. Ali, H. A. Khan, and M. G. Pecht, “Evaluation of Li-Based Battery Current, Voltage, and Temperature Profiles for In-Service Mobile Phones,” *IEEE Access*, vol. 8, pp. 73665–73676, Apr. 2020.
107. L. Zhang, H. Ge, Y. Ma, J. Xue, H. Li, and M. Pecht, “Multi-Objective Optimization Design of a Notch Filter Based on Improved NSGA-II for Conducted Emissions,” *IEEE Access*, vol. 8, pp. 83213–83223, Apr. 2020.
108. X. Liu, L. Li, D. Das, I. H. Naqvi, and M. G. Pecht, “Online Degradation State Assessment Methodology for Multi-Mode Failures of Insulated Gate Bipolar Transistor,” *IEEE Access*, Mar. 2020, vol. 8, pp. 69471–69481, Mar. 2020.
109. L. Kong and M. G. Pecht, “Understanding and Predicting the Risks in Li-Ion Batteries,” in Proceedings IRF2020: 7th International Conference Integrity-Reliability-Failure., 2020, pp. 587–588.
110. A. Kumar, M. A. Hoque, P. Nurmi, M. G. Pecht, S. Tarkoma, and J. Song, “Battery health estimation for IoT devices using v-edge dynamics,” in HotMobile 2020 - Proceedings of the 21st International Workshop on Mobile Computing Systems and Applications, Mar. 2020, vol. 20, pp. 56–61.
111. W. Du, M. Kang, and M. Pecht, “Fault Diagnosis Using Adaptive Multifractal Detrended Fluctuation Analysis,” *IEEE Trans. Ind. Electron*., vol. 67, no. 3, pp. 2272–2282, Mar. 2020.
112. X. Hu, Y. Zheng, D. A. Howey, H. Perez, A. Foley, and M. Pecht, “Battery warm-up methodologies at subzero temperatures for automotive applications: Recent advances and perspectives,” *Progress in Energy and Combustion Science*, vol. 77. Elsevier Ltd, p. 100806, 01-Mar-2020.
113. C. Lee, S. Jo, D. Kwon, and M. Pecht, “Capacity-fading Behavior Analysis for Early Detection of Unhealthy Li-ion Batteries,” *IEEE Trans. Ind. Electron*., pp. 1–1, Feb. 2020.
114. X. Hu, L. Xu, X. Lin, and M. Pecht, “Battery Lifetime Prognostics,” *Joule*, vol. 4, no. 2. pp. 310–346, Feb. 2020.
115. M. Zhao, B. Tang, L. Deng and M. Pecht, "Multiple wavelet regularized deep residual networks for fault diagnosis", Measurement: Journal of the International Measurement Confederation, vol. 152, p. 107331, 2020. Available: 10.1016/j.measurement.2019.107331.
116. M. Zhao, S. Zhong, X. Fu, B. Tang, S. Dong, and M. Pecht, “Deep Residual Networks with Adaptively Parametric Rectifier Linear Units for Fault Diagnosis,” IEEE Trans. Ind. Electron., pp. 1–1, Feb. 2020.
117. Y. Lin, H. Ge, S. Chen, and M. Pecht, “Two-level fault diagnosis RBF networks for auto-transformer rectifier units using multi-source features,” J. Power Electron., vol. 20, no. 3, pp. 754–763, Feb. 2020.
118. C. E. Hendricks, A. N. Mansour, D. A. Fuentevilla, G. H. Waller, J. K. Ko, and M. G. Pecht, “Copper Dissolution in Overdischarged Lithium-ion Cells: X-ray Photoelectron Spectroscopy and X-ray Absorption Fine Structure Analysis,” J. Electrochem. Soc., vol. 167, no. 9, p. 090501, Jan. 2020.
119. X. Liu, L. Li, D. Das, and M. Pecht, “An Electro-thermal Parametric Degradation Model of Insulated Gate Bipolar Transistor Modules,” Microelectronics Reliability, Vol. 104, 113559, Jan. 2020.
120. W. Diao, S. Saxena, and M. G. Pecht, “Analysis of Specified Capacity in Power Banks,” IEEE Access, Jan. 2020, vol. 8, pp. 21326–21332, 2020.
121. S. Woo, M. Pecht, and D. L. O’Neal, “Reliability design and case study of the domestic compressor subjected to repetitive internal stresses,” Reliab. Eng. Syst. Saf., vol. 193, p. 106604, Jan. 2020.
122. J. A. Romero, M. H. Azarian, and M. Pecht, “Life model for tantalum electrolytic capacitors with conductive polymers,” Microelectron. Reliab., vol. 104, p. 113550, Jan. 2020.

123. Lee, N., M. H. Azarian, M. Pecht, J. Kim, and J. Im, "A Comparative Study of Deep Learning-Based Diagnostics for Automotive Safety Components Using a Raspberry Pi," *2019 IEEE International Conference on Prognostics and Health Management (ICPHM)*, San Francisco, CA, June 17–20, 2019. DOI: https://doi.org/10.1109/ICPHM.2019.8819436
124. E. George, D. Chen, M. Osterman and M. Pecht, "Experimental Approach to Determine Damage Curves for SnAgCu Solder Under Sequential Cyclic Loads", Journal of Electronic Materials, vol. 49, no. 2, pp. 1412-1420, 2019. Available: 10.1007/s11664-019-07811-5.
125. Das, D., E. Elburn, M. Pecht, B. Sood, "Evaluating Impact of Information Uncertainties on Component Reliability Assessment," *2019 IEEE International Reliability Physics Symposium (IRPS)*, Monterey, CA, March 31–April 4, 2019. DOI: https://doi.org/ 10.1109/IRPS.2019.8720470
126. Yu, S., Z. Wu, X. Zhu, and M. Pecht, "A Domain Adaptive Convolutional LSTM Model for Prognostic Remaining Useful Life Estimation Under Variant Conditions," *2019 IEEE International Conference on Prognostics and Health Management*, *(ICPHM)*, Paris, France, May 2–5, 2019. DOI: https://doi.org/10.1109/PHM-Paris.2019.00030
127. Bhattacharya, S., L. Fiondella, S. Saxena, and M. Pecht, "Quantifying the Impact of Prognostic Distance on Average Cost per Cycle," *2019 IEEE International Conference on Prognostics and Health Management*, *(ICPHM)*, San Francisco, CA, June 17–20, 2019. DOI: https://doi.org/10.1109/ICPHM.2019.8819408
128. Khemani, V. M. H. Azarian, and M. G. Pecht, "Electronic Circuit Diagnosis with No Data," *2019 IEEE International Conference on Prognostics and Health Management,\ (ICPHM)*, San Francisco, CA, June 17–20, 2019. DOI: https://doi.org/10.1109/ICPHM.2019.8819424
129. Yu, Q., R. Xiong, R. Yang, and M. Pecht, "Online Capacity Estimation for Lithium-Ion Batteries Through Joint Estimation Method," *Applied Energy*, Vol. 255, 113817, Dec. 2019. DOI: https://doi.org/10.1016/j.apenergy.2019.113817
130. Zhou, Y., M. Huang, and M. Pecht, "Remaining Useful Life Estimation of Lithium-ion Cells Based on k-Nearest Neighbor Regression with Differential Evolution Optimization," *Journal of Cleaner Production*, 119409, Nov. 2019. DOI: https://doi.org/10.1016/j.jclepro.2019.119409
131. Li, J., D. Wang, and M. Pecht, "An Electrochemical Model for High C-Rate Conditions in Lithium-ion Batteries," *Journal of Power Sources*, Vol. 436, 226885, Oct. 2019. DOI: https://doi.org/10.1016/j.jpowsour.2019.226885
132. Aalund, R., and M. Pecht, "The Use of UL 1642 Impact Testing for Li-ion Pouch Cells," *IEEE Access*, Vol. 7, pp. 176706–176711, Dec. 2019. DOI: https://doi.org/10.1109/ACCESS.2019.2957814
133. Wu, G., M. Jiang, D. Das, and M. Pecht. "ACA Curing Process Optimization Based on Curing Degree Considering Shear Strength of Joints," *IEEE Access*, Vol. 7, pp. 182906–182915, Dec 2019.
134. Chen, S., H. Ge, J. Li, and M. Pecht, "Progressive Improved Convolutional Neural Network for Avionics Fault Diagnosis," *IEEE Access*, Vol. 7, pp. 177362–177375, Nov. 2019. DOI: https://doi.org/10.1109/ACCESS.2019.2954170
135. Wu, Z., W. Lin, B. Fu, J. Guo, Y. Ji, and M. Pecht, "A Local Adaptive Minority Selection and Oversampling Method for Class-Imbalanced Fault Diagnostics in Industrial Systems," *IEEE Transactions on Reliability*, Nov. 2019. DOI: https://doi.org/10.1109/TR.2019.2942049
136. Yao, X.-Y., and M. Pecht, "Dynamic Response Time Model of Metal Foam Magnetorheological Damper," *International Journal of Applied Electromagnetics and Mechanics*, Oct 2019. DOI: https://doi.org/10.3233/JAE-190063
137. Zhao, J., Y. Xing, Z, Sun, and M. Pecht, "Transmission Characteristics Analysis of an MCR-WPT System with SP Resonance Structure Based on Harmonic Current Influence," *IEICE Electronics Express*, Vol. 16, No. 17, pp. 1–6, 2019. DOI: https://doi.org/10.1587/elex.16.20190460
138. Wu, Z., S. Yu, X. Zhu, Y. Ji, and M. Pecht, "A Weighted Deep Domain Adaptation Method for Industrial Fault Prognostics According to Prior Distribution of Complex Working Conditions," *IEEE Access*, Vol. 7, No. 1, pp. 139802–139814, Dec. 2019. DOI: https://doi.org/10.1109/ACCESS.2019.2943076
139. Li, J., L. Wang, C. Lyu, D. Wang, and M. Pecht, "Parameter Updating Method of a Simplified First Principles-Thermal Coupling Model for Lithium-ion Batteries," *Applied Energy*, Vol. 256, 113924, Dec. 2019. DOI: https://doi.org/10.1016/j.apenergy.2019.113924
140. Maroti, P. K., S. Padmanaban, J. B. Holm-Nielsen, M. G. Pecht, and O. Ojo, "A Novel Configurations of Modified CUK Converter Using Multiple VLSI Modules for High Voltage Renewable Energy Application," *IECON 2019 - 45th Annual Conference of the IEEE Industrial Electronics Society*, 14-17 Oct. 2019, Lisbon, Portugal, published in *IEEE Explore*, 4083-4088, Dec. 2019. DOI: https://doi.org/10.1109/IECON.2019.8926748

141. Zhao, M., S. Zhong, X. Fu, B. Tang, and M. Pecht, "Deep Residual Shrinkage Networks for Fault Diagnosis," *IEEE Transactions on Industrial Informatics*, Sept 2019. DOI: https://doi.org/10.1109/TII.2019.2943898
142. H. Liu, Y. Wang, F. Li, X. Wang, C. Liu, and M. G. Pecht, "Perceptual Vibration Hashing by Sub-band Coding: An Edge Computing Method for Condition Monitoring," *IEEE Access*, Vol. 7, No. 1, pp. 129644–129658, Dec. 2019. DOI: https://doi.org/10.1109/ACCESS.2019.2940381
143. Zhang, Y., R. Xiong, H. He, X. Qu, and M. Pecht. "State of Charge-dependent Aging Mechanisms in Graphite/Li(NiCoAl)O_2 Cells: Capacity Loss Modeling and Remaining Useful Life Prediction," *Applied Energy*, Vol. 255, 113818, Dec. 2019. DOI: https://doi.org/10.1016/j.apenergy.2019.113818
144. Diao, W., M. Pecht, and T. Liu. "Management of Imbalances in Parallel-connected Lithium-ion Battery Packs," *Journal of Energy Storage*, Vol. 24, 100781, May 2019. DOI: https://doi.org/10.1016/j.est.2019.100781
145. Kaushik, L., M. Azarian, and M. Pecht, "Fretting Performance Comparison Between PFPE and PAO Based Lubricants for Lightly-Loaded Gold-Plated Electrical Contacts," *2019 IEEE Holm Conference on Electrical Contacts*, Milwaukee, WI, Sept. 14–18, 2019. DOI: https://doi.org/10.1109/HOLM.2019.8923785
146. Dong, T., T. Liu, and M. Pecht. "A Compliant Electrode Developed by Plasticized Polyvinyl Chloride Filled with Multi-Walled Carbon Nanotubes for Sensing and Actuating," *Sensors & Actuators: A. Physical*, Vol. 296, pp. 383–391, Sept. 2019.
147. Niu, G., L. Xiong, X. Qin, and M. Pecht, "Fault Detection Isolation and Diagnosis of Multi-Axle Speed Sensors for High-Speed Trains," *Mechanical Systems and Signal Processing*, Vol. 131, pp. 183–198, Sept. 2019. DOI: https://doi.org/10.1016/j.ymssp.2019.05.053
148. Azarian, M. H., N. Lee, and M. G. Pecht, "A Framework to Interpret Deep Learning-Based Health Management System with Human Interactions," *Proceedings of the Annual Conference of the PHM Society*, Vol. 11, No. 1, Sept. 2019. DOI: https://doi.org/10.36001/phmconf.2019.v11i1.914
149. Huang, C.-M., J. A. Romero, M. Osterman, D. Das, and M. Pecht. "Life Cycle Trends of Electronic Materials, Processes and Components," *Microelectronics Reliability*, Vol. 99, pp. 272–276, Aug. 2019.
150. Diao, W., S. Saxena, B. Han, and M. Pecht. "Algorithm to Determine Knee Point on Capacity Fade Curves of Lithium ion Batteries," *Energies*, Vol. 12, pp. 2910–2919, July 2019.
151. Patel, N., R. G. Utter, D. Das, and M. Pecht. "Surface Degradation of Strontium-based Perovskite Electrodes of Solid Oxide Fuel Cells," *Journal of Power Sources*, Vol. 438, 227040, Oct. 2019.
152. Lyu, C., J. Li, L. Zhang, L. Wang, D. Wang, and M. Pecht. "State of Charge Estimation Based on a Thermal Coupling Simplified First-Principles Model for Lithium-ion Batteries," *Journal of Energy Storage*, Vol. 25, Oct. 2019. DOI: https://doi.org/10.1016/j.est.2019.100838.
153. Kaushik, L., M. H. Azarian, and M. Pecht. "Effect of Different Lubricant Films on Contact Resistance of Stationary Separable Gold-Plated Electrical Contacts," *Journal of Materials Science: Materials in Electronics*, July 2019. DOI: https://doi.org/10.1007/s10854-019-01806-y
154. Su, Y., X. R. Liang, H. Wang, J. J. Wang, and M. Pecht. "A Maintenance and Troubleshooting Method Based on Integrated Information and System Principles," *IEEE Access*, Vol. 7, pp. 70513–70524, May 2019.
155. Wu, Y., Y. Wang, W. K. C. Yung, and M. Pecht. "Ultrasonic Health Monitoring of Lithium-Ion Batteries," *Electronics*, Vol. 8, pp. 751–767, 2019. DOI: https://doi.org/10.3390/electronics8070751 Published as part of the Special Issue Advanced Battery Technologies: New Applications and Management Systems
156. Diao, W., S. Saxena, and M. Pecht. "Accelerated cycle life testing and capacity degradation modeling of $LiCoO_2$-graphite cells," *Journal of Power Sources*, Vol. 435, 226830, Sept 2019. DOI: https://doi.org/10.1016/j.jpowsour.2019.226830
157. Y.-Z. Zhang, R. Xiong, H.-W. He, X. Qu, and M. Pecht, "Aging Characteristics-Based Health Diagnosis and Remaining Useful Life Prognostics for Lithium-Ion Batteries," *eTransportation*, Vol. 1, 100004, Aug. 2019. DOI: https://doi.org/10.1016/j.etran.2019.100004
158. Zang, Y., W. ShangGuan, B. G. Cai, H. S. Wang, L. Kaushik, and M. G. Pecht, "System-Level Fault Prognosis for High-Speed Railway On-Board Systems," *Transportation Research Record*, Aug. 2019. DOI: https://doi.org/10.1177/0361198119867673
159. Sun, Y., L. Kong, H. A. Khan, and M. Pecht. "Li-ion Battery Reliability–A Case Study of the Apple iPhone," *IEEE Access*, Vol. 7, pp. 71131–71141, May 2019. DOI: https://doi.org/10.1109/ACCESS.2019.2918401
160. W. Diao, S. Saxena, B. Han, and M. Pecht, "Algorithm to Determine the Knee Point on Capacity Fade Curves of Lithium-Ion Cells," Energies, vol. 12, no. 15, p. 2910, Jul. 2019.
161. Su, Y., X. Liang, C. Gu, V. Khemani, and M. Pecht. "A Multivalued Test and Diagnostic Strategy Optimization Method for Aircraft System Fault Diagnosis," *IEEE International Conference on Prognostics and Health Management* (ICPHM), Burlingame, CA, USA, June 17–19, 2019.

162. Lee, J., D. Kwon, and M. G. Pecht. "Reduction of Li-ion Battery Qualification Time Based on Prognostics and Health Management," *IEEE Transactions on Industrial Electronics*, Vol. 66, No. 9, pp. 7310–7315, Sept 2019.
163. Dinmohammadi, F., D. Flynn, C. Bailey, M. Pecht, C. Yin, P. Rajaguru, and V. Robu. "Predicting Damage and Life Expectancy of Subsea Power Cables in Offshore Renewable Energy Applications," *IEEE Access*, Vol. 7, pp. 54658–54669, May 2019.
164. Zhao, M., M. Kang, B. Tang, and M. Pecht. "Multiple Wavelet Coefficients Fusion in Deep Residual Networks for Fault Diagnosis," *IEEE Transactions on Industrial Electronics*, Vol. 66, No. 6, pp. 4696–4706, June 2019.
165. Saxena, S., Y. Xing, D. Kwon, and M. Pecht. "Accelerated Degradation Model for C-rate loading of Lithium-ion Batteries," *International Journal of Electrical Power & Energy Systems*, Vol. 107, pp. 438–445, May 2019.
166. Yao, X.-Y., S. Saxena, L. Su, and M. Pecht. "The Explosive Nature of Tab Burrs in Li-ion Batteries," *IEEE Access*, Vol. 7, pp. 45978–45982, Apr 3, 2019.
167. Xiong, R., Y. Zhang, J. Wang, H. He, S. Peng, M. Pecht. "Lithium-ion Battery Health Prognosis Based on a Real Battery Management System Used in Electric Vehicles," *IEEE Transactions on Vehicular Technology.* Vol. 68, No. 5, pp. 4110–4121, 2019, May 2019. DOI: https://doi.org/10.1109/TVT.2018.2864688
168. Al-Zoghbi, L., D. Das, P. Rundle, and M. Pecht. "Breaking the Trust: How Companies Are Failing Their Customers," *IEEE Access*, Vol. 7, pp. 52522–52531, Apr 2019.
169. Yu, Q., R. Xiong, C. Li, and M. Pecht. "Water-resistant Smartphone Technologies," *IEEE Access*, Vol. 7, pp. 42757–42773, March 19, 2019.
170. Yao, X.-Y., and M. Pecht. "Effect of Metal Foams on the Dynamic Response Time of a Magnetorheological Damper," *International Journal of Applied Electromagnetic Mechanics*, March 2019. DOI: https://doi.org/10.3233/JAE-190022
171. Wenliao, D., M. Kang, and M. Pecht. "Fault Diagnosis Using Adaptive Multifractal Detrended Fluctuation Analysis." *IEEE Transactions on Industrial Electronics*, Mar 2019. DOI: https://doi.org/10.1109/TIE.2019.2892667
172. Xiong, R., Y. Zhang, H. He, and M. Pecht. "Validation and Verification of a Hybrid Method for Remaining Useful Life Prediction of Lithium-ion Batteries," *Journal of Cleaner Production*, Vol. 212, pp. 240–249, Mar 2019.
173. Ning, Y., M. Azarian, and M. Pecht. "Development of a Microvia Fatigue Life Model Using a Response Surface Method," *IEEE Transactions on Device and Materials Reliability*, Vol. 19, No. 1, pp. 176–188, Mar 2019.
174. Sood, B., J. Shue, J. Leitner, K. Daniluk, L. Sindjui, and M. Pecht. "A Study on Effects of Copper Wrap Specifications on Printed Circuit Board Reliability." *IEEE Transactions on Reliability.* Vol. 68, No. 1, pp. 248–266, Mar 2019.
175. Yao, X.-Y., M. Pecht. "Tab Design and Failures in Cylindrical Li-ion Batteries," *IEEE Access*, Vol. 7, pp. 24082–24095, Feb 2019.
176. Li, W., Y. Li, Y. Tan, Y. Cao, C. Chen, Y. Cai, K. Y. Lee, and M. Pecht, "Maximizing Network Resilience against Malicious Attacks," *Scientific Reports*, Vol. 9, No. 1, 2261, Feb. 2019.
177. Valentine, N., M. Azarian, and M. Pecht. "Metallized Film Capacitors Used for EMI Filtering: A Reliability Review," *Microelectronics Reliability*, Vol. 92, pp. 123–135, Jan 2019.
178. Elburn, E., B. Sood, D. Das, M. Pecht. "Utilization of Data and Models for COTS Part Reliability," *2019 Annual Reliability and Maintainability Symposium (RAMS) Assessment*, 28–31 Jan 2019.
179. Zhang, Y., W. Shangguan, B. Cai, H. Wang, and M. Pecht. "Methods for Fault Diagnosis of High-Speed Railways: A Review," *Journal of Risk and Reliability*, Jan 2019. DOI: https://doi.org/10.1177/1748006X18823932
180. Jia, Z., Z. Liu, C. Vong, and M. Pecht. "A Rotating Machinery Fault Diagnosis Method Based on Feature Learning of Thermal Images," *IEEE Access*, Vol. 7, pp. 12348–12359, Jan 2019.
181. Su, L., X. Yu, K. Li, X. Yao, and M. Pecht. "Simulation and Experimental Verification of Edge Blurring Phenomenon in Microdefect Inspection Based on High-Frequency Ultrasound," *IEEE Access*, Vol. 7, pp. 11515–11525, Jan 2019.
182. Dalvand, S., M. Kang, F. Dalvand, and M. Pecht. "Detection of Generalized-Roughness and Single-Point Bearing Faults Using Linear Prediction-Based Current Noise Cancellation," *IEEE Transactions on Industrial Electronics*, Vol. 65, No. 12, pp. 9728–9738, Dec 2018.
183. Patel, N., S. Bishop, R. Utter, D. Das, and M. Pecht. "Failure Modes, Mechanisms, Effects, and Criticality Analysis of Ceramic Anodes of Solid Oxide Fuel Cells." *Electronics.* Vol. 7, No. 11, pp. 323-339, Nov 2018.
184. Sun, Y., S. Saxena, and M. Pecht. "Derating Guidelines for Lithium-ion Batteries," *Energies*, Vol. 11, No. 12, pp. 3295–3314, Dec 2018.

185. Wang, K., H. Guo, A. Xu, N. Jameson, B. Yan, and M. Pecht. "Creating Self-aware Low-Voltage Electromagnetic Coils for Incipient Insulation Degradation Monitoring for Smart Manufacturing," *IEEE Access*, Vol. 6, pp. 69860–69868, Nov 2018.
186. Zhao, J., Z. Sun, M. Pecht, and S. Zhou. "Analysis and Experiments on Transmission Characteristics of LCCL Mobile Wireless Power Transfer System," *IEICE Electronics Express*, Vol. 15, No. 23, p. 20180964, Nov 2018.
187. Diao, W., Y. Xing, S. Saxena, and M. Pecht. "Evaluation of Present Accelerated Temperature Testing and Modeling of Batteries." *Applied Sciences.* Vol. 8, No. 10, pp. 1786–1796, Oct 2018.
188. Kohani, M., A. Bhandare, L. Guan, D. Pommerenke, and M. Pecht. "Evaluating Characteristics of Electrostatic Discharge (ESD) Events in Wearable Medical Devices: Comparison with the IEC 61000-4-2 Standard," *IEEE Transactions on Electromagnetic Compatibility*, Vol. 60, No. 5, pp. 1304–1312, Oct 2018.
189. Du, X., Z. Yang, C. Chen, X. Li, and M. Pecht. "Reliability Analysis of Repairable Systems Based on a Two-Segment Bathtub-Shaped Failure Intensity Function," *IEEE Access*, Vol. 6, pp. 52374–52384, Sept 2018.
190. Wu, L., M. Kang, J. Tian, J. Gao, and M. Pecht. "Unsupervised Locality-Preserving Robust Latent Low-Rank Recovery-Based Subspace Clustering for Fault Diagnosis," *IEEE Access*, Vol. 6, pp. 52345–52354, Sept 2018.
191. Shu, L., M. Mukherjee, M. Pecht, N. Crespi, and S. N. Han. "Challenges and Research Issues of Data Management in IoT for Large-Scale Petrochemical Plants," *IEEE Systems Journal*, Vol. 12, No. 3, pp. 2509–2523, Sept 2018.
192. Kirschbaum, L., F. Dinmohammadi, D. Flynn, and M. Pecht. "Failure Analysis Informing Embedded Health Monitoring of Electromagnetic Relays." *ICSRS 2018.* Spain, Sept 2018.
193. Sun, Y., X. Hao, M. Pecht, and Y. Zhou, "Remaining Useful Life Prediction for Lithium-Ion Batteries Based on an Integrated Health Indicator," *Microelectronics Reliability*, Vols. 88–90, pp. 1189–1194, Sept. 2018. https://doi.org/10.1016/j.microrel.2018.07.047
194. He, W., M. Pecht, D. Flynn, and F. Dinmohammadi, "A Physics-based Electrochemical Model for Lithium-ion Battery State-of-Charge Estimation Solved by an Optimised Projection-based Method and Moving-Window Filtering," *Energies*, Vol. 11, No. 8, pp. 2120–2143, Aug 2018. Part of a Special Issue on Battery Storage Technology for a Sustainable Future.
195. Du, W., S. Han, X. Song, S. Tian, and M. Pecht, "Condition Monitoring Model of a Hydraulic System in Truck Crane," *2018 IEEE International Conference on Prognostics and Health Management (ICPHM)*, Aug. 2018. DOI: 10.1109/ICPHM.2018.8448559
196. Saxena, S., M. Kang, Y. Xing, and M. Pecht, "Anomaly Detection During Lithium-ion Battery Qualification Testing," *2018 IEEE International Conference on Prognostics and Health Management (ICPHM)*, Aug. 2018. DOI: 10.1109/ICPHM.2018.8448735
197. Zhou, Y., M. Huang, and M. Pecht, "An Online State of Health Estimation Method for Lithium-ion Batteries Based on Integrated Voltage," *2018 IEEE International Conference on Prognostics and Health Management (ICPHM)*, Seattle, WA, 2018, pp. 1–5. DOI: 10.1109/ICPHM.2018.8448947
198. Liu, J., J. Liu, D. Yu, M. Kang, J. Liu, W. Yan, Z. Wang, M. Pecht. "Fault Detection for Gas Turbine Hot Components Based on Convolutional Neural Network," *Energies*, Vol. 11, No. 8, pp. 2149–2167 Aug 2018.
199. Romero, J., M. Azarian, C. Morillo, and M. Pecht. "Effects of Moisture and Temperature on Membrane Switch Laptop Keyboards," *IEEE Transactions on Device and Materials Reliability*, Vol. 18, No. 4, pp. 535–545, Aug 2018.
200. Kong, L., C. Li, J. Jiang, and M. Pecht. "Li-ion Battery Fire Hazards and Safety Strategies," *Energies*, Vol. 11, No. 9, pp. 2191–2202, Aug 2018. Highlighted in August 2018 Battery Engineering literature review and featured in the '10 Ionizing Papers' blog
201. Ye, X., C. Chen, M. Kang, G. Zhai, and M. Pecht. "A Joint Distribution-Based Testability Metric Estimation Model for Unreliable Tests," *IEEE Access*, Vol. 6, pp. 42566–42577, July 2018.
202. Zhang, Y., R. Xiong, H. He, and M. Pecht. "Long Short-term Memory Recurrent Neural Network for Remaining Useful Life Prediction of Lithium-ion Batteries," *IEEE Transactions on Vehicular Technology*, Vol. 67, pp. 5695-5705, July 2018.
203. Pecht, M. "When E-cigarettes Go Boom," *Spectrum IEEE.org*, Jul 2018.
204. Sun, Y., T. Sun, C. Yu, and M. Pecht. "Computing Lifetime Distributions and Reliability for Systems with Outsourced Components: A Case Study," *IEEE Access*, Vol. 6, pp. 31359-31366, June 2018.
205. J. Li, L. Wang, C. Lyu, E. Liu, Y. Xing, and M. Pecht, "A parameter estimation method for a simplified electrochemical model for Li-ion batteries," Electrochim. Acta, vol. 275, pp. 50–58, Jun. 2018.
206. Wu, Y., S. Saxena, Y. Xing, Y. Wang, C. Li, W. Yung, and M. Pecht. "Analysis of Manufacturing-Induced Defects and Structural Deformations in Lithium-ion Batteries Using X-ray Computed Tomography," *Energies*, Vol. 11, No. 4, pp. 925–947, Apr 2018.

207. Manoharan, S., C. Patel, P. McCluskey, and M. Pecht. "Effective Decapsulation of Copper Wire-bonded Microelectronic Devices for Reliability Assessment," *Microelectronics Reliability*, Vol. 84, pp. 197–207, May 2018.
208. Zou, C., L. Zhang, X. Hu, Z. Wang, T. Wik, and M. Pecht. "A Review of Fractional-order Techniques Applied to Lithium-ion Batteries, Lead-acid Batteries, and Supercapacitors," *Journal of Power Sources*, Vol. 390, pp. 286–296, June 2018.
209. Kang, M., M. Zhao, B. Tang, and M. Pecht. "Deep Residual Networks with Dynamically Weighted Wavelet Coefficients for Fault Diagnosis of Planetary Gearboxes." *IEEE Transactions on Industrial Electronics*, Vol. 65, No. 5, pp. 4290–4300, May 2018.
210. Saxena, S., L. Kong, and M. Pecht. "Exploding E-cigarettes: A Battery Safety Issue," *IEEE Access*, Vol. 6, pp. 21442–21466, May 2018.
211. Pecht, M., F. Dagorn, and D. Das. "Managing Electronics Part Changes in the Supply Chain," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 8, No. 5, pp. 883–895, Apr 2018. Listed in IEEE top 5 most popular articles in 2018.
212. Saxena, S., Y. Xing, and M. Pecht. "A Unique Failure Mechanism in the Nexus 6P Lithium-ion Battery," *Energies*, Vol. 11, No. 4, pp. 841–854, Apr 2018.
213. Liu, Z., Z. Jia, C. Vong, J. Han, C. Yan, and M. Pecht. "A Patent Analysis of Prognostics and Health Management (PHM) Innovations for Electrical Systems," *IEEE Access*, Vol. 6, pp. 18088–18107, Mar 2018.
214. Sood, B., and M. Pecht. "The Effect of Epoxy/Glass Interfaces on CAF Failures in Printed Circuit Boards." *Microelectronics Reliability*, Vol. 82, pp. 235–243, Mar 2018.
215. Kong, L., Y. Xing and M. G. Pecht, "In-Situ Observations of Lithium Dendrite Growth," *IEEE Access*, vol. 6, pp. 8387-8393, Feb. 2018. DOI: https://doi.org/10.1109/ACCESS.2018.2805281
216. Zhang, Y., R. Xiong, H. He, and M. Pecht. "Lithium-ion Battery Remaining Useful Life Prediction with Box-Cox Transformation and Monte Carlo Simulation," *IEEE Transactions on Industrial Electronics*, Vol. 66, No. 2, pp. 1585–1597, Feb 2018.
217. Alagarsamy, K., M. Kohani, A. Fortier, K. Alagarsamy, M. Kohani, and M. Pecht. "Risk of Tin Whiskers in Medical Device," *Journal of Biomedical Engineering and Research*, Vol. 2, Feb 2018.
218. Motabar, P., H. Gonzalez, P. Rundle, and M. Pecht. "How Poor Reliability Affects Warranties: An Analysis of General Motors' Powertrain Warranty Reduction," *IEEE Access*, Vol. 6, pp. 15065–15074, Feb 2018.
219. Huang, C. M., D. Nunez, J. Coburn, and M. Pecht, "Risk of Tin Whiskers in the Nuclear Industry," *Microelectronics Reliability*, Vol. 81, pp. 22–30, Feb. 2018. https://doi.org/10.1016/j.microrel.2017.12.019
220. Xiong, R., Y. Zhang, H. He, X. Zhou, and M. Pecht. "A Double-scale, Particle-filtering, Energy State Prediction Algorithm for Lithium-ion Batteries," *IEEE Transactions on Industrial Electronics*, Vol. 65, No. 2, pp. 1526–1538, Feb 2018.
221. S. Peng, X. Zhua, Y. Xing, H. Shi, X. Caid, M. Pecht. "An adaptive state of charge estimation approach for lithium-ion series connected battery system," *Journal of Power Sources*, Vol. 392, pp. 48–59, 2018.
222. Diao, W., J. Jiang, C. Zhang, H. Liang, and M. Pecht. "Energy State of Health Estimation for Battery Packs Based on the Degradation and Inconsistency," *Energy Procedia*, Vol. 142, pp. 3578–3583, Dec 2017.
223. X. Su, S. Wang, M. Pecht, P. Ma, and L. Zhao, "Prognostics of lithium-ion batteries based on different dimensional state equations in the particle filtering method," Trans. Inst. Meas. Control, vol. 39, no. 10, pp. 1537–1546, Oct. 2017.
224. Zhang, Z.-X., X.-S. Si, C.-H. Hu, and M. G. Pecht. "A Prognostic Model for Stochastic Degrading Systems with State Recovery: Application to Li-ion Batteries," *IEEE Transactions on Reliability*, Vol. 66, No. 4, pp. 1293–1308, Aug 2017.
225. Fortier, A., M. Tsao, N. Williard, L. Yinjiao Xing, and M. Pecht. "Preliminary Study on Integration of Fiber Optic Bragg Grating Sensors in Li-ion Batteries and In Situ Strain and Temperature Monitoring of Battery Cells," *Energies*, Vol. 10, No. 7, pp. 838–849, June 2017.
226. H. Huo, Y. Xing, M. Pecht, B. J. Züger, N. Khare, and A. Vezzini, "Safety Requirements for Transportation of Lithium Batteries," Energies, vol. 10, no. 6, p. 793, Jun. 2017
227. Fan, J., M. G. Mohamed, C. Qian, X. Fan, G. Zhang, and M. Pecht. "Color Shift Failure Prediction for Phosphor-converted White LEDs by Modeling Features of Spectral Power Distribution with a Nonlinear Filter," *MDPI Materials*, Vol. 10, No. 10, pp. 819–835, July 2017.
228. Huang, S. C., K. H. Tseng, J. W. Liang, C. L. Chang, and M. Pecht. "An Online SOC and SOH Estimation Model for Lithium-ion Batteries," *Energies*, Vol. 10, No. 4, pp. 512–530, April 2017.

229. Saxena, S., G. Sanchez, and M. Pecht. "Batteries in Portable Electronic Devices: A User's Perspective." *IEEE Industrial Electronics Magazine*, Vol. 11, No. 2, pp. 35-44, June 2017.
230. X. Cheng and M. Pecht, "In Situ Stress Measurement Techniques on Li-ion Battery Electrodes: A Review," Energies, vol. 10, no. 5, p. 591, Apr. 2017
231. Dalvand, F., S. Dalvand, F. Sharafi, and M. Pecht. "Current Noise Cancellation for Bearing Fault Diagnosis Using Time-Shifting," *IEEE Transactions on Industrial Electronics,* Vol. 64, No. 10, pp 8138–8147, April 2017.
232. Vasan, A., and M. Pecht. "Electronic Circuit Health Estimation Through Kernel Learning," *IEEE Transactions on Industrial Electronics*, Vol. 65, No. 2, pp. 1585–1594, 2017.
233. Su, X., S. Wang, M. Pecht, L. Zhao, and Z. Ye. "Interacting Multiple Model Particle Filter for Prognostics of Lithium-ion Batteries," *Microelectronics Reliability*, Vol. 70, pp. 59–60, 2017.
234. Sun, B., X. Jiang, K.-C. Yung, J. Fan, and M. Pecht. "A Review of Prognostic Techniques for High-Power White LEDs," *IEEE Transactions on Power Electronics*, Vol. 32, No. 8, pp. 6338–6362, Aug 2017.
235. Jameson, J., M. Azarian, and M. Pecht, "Thermal Degradation of Polyimide Insulation and its Effect on Electromagnetic Coil Impedance," *Proceedings of MFPT 2017 Conference*, Virginia Beach, VA, 2017.
236. Li, N. M., D. Das, and M. Pecht. "Shelf Life Evaluation Method for Electronic and other Components using a Physics of Failure (PoF) Approach," *Proceedings of MFPT 2017 Conference*, Virginia Beach, VA, 2017.
237. Liu, J., M. Kang, J. Liu, Z. Wang, D. Yu, and M. Pecht. "A Comparative Study on Anomaly Detection of the Combustion System in Gas Turbine," *Proceedings of MFPT 2017 Conference*, Virginia Beach, VA, 2017.
238. Li, J., L. Wang, C. Lyu, and M. Pecht. "State of Charge Estimation Based on a Simplified Electrochemical Model for a Single LiCoO2 Battery and Battery Pack," *Energy*, Vol. 133, pp. 572–583, 2017.
239. Shah, R., M. Azarian, and M. Pecht. "Fault Detection in Bearings Using Autocorrelation," *Proceedings of MFPT 2017*, Virginia Beach, VA, 2017.
240. Cheng, X., L. Yao, and M. Pecht. "Lithium-ion Battery State-of-Charge Estimation Based on Deconstructed Equivalent Circuit at Different Open-Circuit Voltage Relaxation Times," *Journal of Zhejiang University-Science A*, Vol. 18, No. 4, pp. 256–267, April 2017.
241. Pandian, G., D. Das, M. Osterman, and M. Pecht. "Risk Assessment of Transition to Lead-free Electronics Assembly," *Proceedings of MFPT 2017*, Virginia Beach, VA, 2017.
242. Chang, M.-H., M. Kang, and M. Pecht. "Prognostics-Based LED Qualification Using Similarity-Based Statistical Measure With RVM Regression Model," *IEEE Transactions on Industrial Electronics*, Vol. 64, No. 7, pp. 5667–5677, July 2017.
243. Yang, Q., R. Bi, K. Yung, and M. Pecht. "Electrochemically Reduced Graphene Oxides/Nanostructured Iron Oxides as Binder-free Electrodes for Supercapacitors," *Electrochimica Acta*, Vol. 231, pp. 125–134, 2017.
244. Shrivastava, A., M. H. Azarian, and M. Pecht. "Failure of Polymer Aluminum Electrolytic Capacitors Under Elevated Temperature Humidity Environments," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 7, No. 5, pp. 745–750, May 2017.
245. Liu, Z., T. Liu, J. Han, S. Bu, X. Tang, and M. Pecht. "Signal Model-Based Fault Coding for Diagnostics and Prognostics of Analog Electronic Circuits," *IEEE Transactions on Industrial Electronics*, Vol. 64, No. 1, pp. 605–614, 2017.
246. Diao, W., N. Xue, V. Bhattacharjee, J. Jiang, O. Karabasoglu, and M. Pecht. "Active Battery Cell Equalization Based on Residual Available Energy Maximization," *Applied Energy*, Vol. 210(C), pp. 690–698, 2018.
247. Formica, T., H. Khan, and M. Pecht. "The Effect of Inverter Failures on the Return on Investment of Solar Photovoltaic Systems," *IEEE Access*, Vol. 5, pp. 21336–21343, 2017.
248. Pecht, M., S. Mathew, L. Gullo, J. Jameson, and A. Vasan. "IEEE Standard Framework for Prognostics and Health Management of Electronic Systems," *IEEE Standard Framework for Prognostics and Health Management of Electronic*. Systems Print: ISBN 978-1-5044-4320-3.
249. Vasan, A., A. Kleyner, and M. Pecht. "A New Application for Failure Prognostics – Reduction of Automotive Electronics Reliability Test Duration." *Annual Conference of the Prognostics and Health Management Society*, Vol. 8, No. 36, pp. 1–9, 2017.
250. Cornelius, B., S. Treivish, Y. Rosenthal, and M. Pecht. "The Phenomenon of Tin Pest: A Review," *Microelectronics Reliability*, Vol. 79, pp. 175–192, Dec 2017.
251. Pandian, G., D. Das, Chuan Li, E. Zio, and M. Pecht. "A Critique of Reliability Prediction Techniques for Avionics Applications," *Chinese Journal of Aeronautics*, Vol. 31, No. 1, pp. 10–20, Jan 2018.
252. Kohani, M., and M. Pecht. "Malfunctions of Medical Devices Due to Electrostatic Occurrences: An Analysis of 10 Years of FDA's Reports," *IEEE Access*, Vol. 6, pp. 5805–5811, 2017.

253. Cheng, X., and M. Pecht. "In Situ Measurements of Stresses on Li-ion Battery Electrodes: A Review," *Energies*, Vol. 10, No. 5, pp. 591–610, 2017.
254. Cripps, E., and M. Pecht. "A Bayesian Nonlinear Random Effects Model for Identification of Defective Batteries from Lot Samples," *Journal of Power Sources*, Vol. 342, pp. 342–350, 2017.
255. Jameson, N., M. Azarian, and M. Pecht, "Impedance-Based Condition Monitoring for Insulation Systems Used in Low-Voltage Electromagnetic Coils," *IEEE Transactions on Industrial Electronics*, Vol. 64, pp. 3748–3757, 2017.
256. Liu, Z., G. Sun, S. Bu, J. Han, X. Tang, and M. Pecht. "Particle Learning Framework for Estimating the Remaining Useful Life of Lithium-Ion Batteries," *IEEE Transactions on Instrumentation and Measurement*, Vol. 66, No. 2, pp. 280–293, 2017.
257. Padmanabhan, S., and M. Pecht. "An Isolated/Non-isolated Novel Multilevel Inverter Configuration for a Dual Three-Phase Symmetrical/Asymmetrical Star-winding Converter," *Engineering Science and Technology, an International Journal*, Vol. 19, No. 4, pp. 1763–1770, Dec 2016.
258. Sanjeevikumar, P., S. Mahajan, F. Blaabjerg, M. Pecht, L. Martirano, and M. Manganelli, "Dual Six-Phase Multilevel AC Drive with Single Carrier Optimized Five-Level PWM for Star-Winding Configuration," *Lecture Notes in Electrical Engineering*, Springer Journal Publications, Vol. 442, pp. 733–740, Dec 2016. (Won the best paper award)
259. Sanjeevikumar, P., S. Mahajan, P. Dhond, F. Blaabjerg, and M. Pecht, "Non-isolated Sextuple Output Hybrid Triad Converter Configurations for High Step-up Renewable Energy Applications," *Lecture Notes in Electrical Engineering*, Springer Journal Publications, Vol. 436, pp. 1–12, Dec 2016. (Won the best paper award)
260. Formica, T., and M. Pecht. "Return on Investment Analysis and Simulation of a 9.12kW (kW) Solar Photovoltaic System," *Solar Energy*, Vol. 144, pp. 629–634, 2017.
261. Fortier, A., and M. Pecht. "A Perspective of the IPC Report on Lead-free Electronics in Military/aerospace Applications," *Microelectronics Reliability*, Vol. 69, pp. 66–70, 2017.
262. Venkitusamy, K., S. Padmanaban, M. Pecht, A. Awasthi, and R. Selvamuthukumaran. "A Modified Boost Rectifier for Elimination of Circulating Current in Power Factor Correction Applications," *Microelectronics Reliability*, Vol. 69, pp. 29–35, 2017.
263. Kwon, D., M. Hodkiewicz, J. Fan, T. Shibutani, and M. Pecht. "IoT-Based Prognostics and Systems Health Management for Industrial Applications," *IEEE Access*, Vol. 4, pp. 3659–3670, 2016.
264. Yung, K.-Ch., Q. Yang, J. Fan, and M. Pecht. "Study of Electrochemical Performance of Li-ion Batteries Based on Simultaneous Measurement of a Three-electrode System," *2016 3rd Asia Pacific World Congress on Computer Science and Engineering (APWC on CSE),* pp. 226–231, Dec. 2016
265. Padmanaban, S., and M. Pecht, "An Isolated/Non-Isolated Novel Multilevel Inverter Configuration for a Dual Three-Phase Symmetrical/Asymmetrical Star-Winding Converter," *Engineering Science and Technology*, Vol. 19, No. 4, pp. 1763–1770, 2016.
266. Cheng, X., L. Yao, Y. Xing, and M. Pecht. "Novel Parametric Circuit Modeling for Li-Ion Batteries," *Energies*, Vol. 9, No. 7, pp. 539–554, 2016.
267. Pecht, M., T. Shibutani, and L. Wu. "A Reliability Assessment Guide for the Transition Planning to Lead-Free Electronics for Companies Whose Products Are RoHS Exempted or Excluded," *Microelectronics Reliability,* Vol. 62, pp. 113–123, 2016.
268. Mukherjee, S., P. Chauhan, M. Osterman, A. Dasgupta, and M. Pecht. "Mechanistic Prediction of the Effect of Microstructural Coarsening on Creep Response of SnAgCu Solder Joints," *Journal of Electronic Materials*, Vol. 45, No. 7, pp. 3712–3725, 2016.
269. Zheng, F., Y. Xing, J. Jiang, B. Sun, J. Kim, and M. Pecht. "Influence of Different Open Circuit Voltage Tests on State of Charge Online Estimation for Lithium-Ion Batteries," *Applied Energy*, Vol. 183, pp. 513–525, 2016.
270. Pearl, A., M. Osterman, and M. Pecht. "Evaluation of ENEPIG and Immersion Silver Surface Finishes Under Drop Loading," *Journal of Electronic Materials*, Vol. 45, pp. 391–402, 2016.
271. George, E., and M. Pecht. "RoHS Compliance in Safety and Reliability Critical Electronics," *Microelectronics Reliability*, Vol. 65, pp. 1–7, Oct. 2016.
272. Kirillov, S., A. Kirillov, V. Iakimkin, A. Khodos, and M. Pecht. "PHM Applications in Medicine and Medical Implantable Devices," *2016 IEEE PHM Conference*, Chengdu, China, October 19–21, 2016.
273. Mohammed, A., and M. Pecht. "A Stretchable and Screen-Printable Conductive Ink for Stretchable Electronics." *Applied Physics Letters*, Vol. 109, 184101, 2016.
274. Zheng, F., J. Jiang, B. Sun, W. Zhang, and M. Pecht. "Temperature Dependent Power Capability Estimation of Lithium-ion Batteries for Hybrid Electric Vehicles," *Energy*, Vol. 113, pp. 64–75, 2016.

275. Pecht, M., T. Shibutani, M. Kang, M. Hodkiewicz, and E. Cripps. "A Fusion Prognostics-based Qualification Test Methodology for Microelectronic Products," *Microelectronics Reliability,* Vol. 63, pp. 320–324, Aug 2016.
276. Woo, S., and Pecht, M. "Reliability Design of Residential-Sized Refrigerators Subjected to Repetitive Random Vibration Loads during Transportation," Athens: ATINER'S Conference Paper Series, No: TRA2016-1981. (2016).
277. Kang, M., J. Kim, I. K. Jeong, J. M. Kim, and M. Pecht. "A Massively Parallel Approach to Real-Time Bearing Fault Detection Using Sub-band Analysis on an FPGA-Based Multicore System," *IEEE Transactions on Industrial Electronics*, Vol. 63, pp. 6325–6335, Oct 2016.
278. Saxena, S., C. Hendricks, and M. Pecht. "Cycle Life Testing and Modeling of Graphite/$LiCoO_2$ Cells under Different State of Charge Ranges," *Journal of Power Sources*, Vol. 327, pp. 394–400, Sep 2016.
279. Kang, M., G. R. Ramaswami, M. Hodkiewicz, E. Cripps, J. Kim and M. Pecht. "A Sequential k-Nearest Neighbor Classification Approach for Data-Driven Fault Diagnosis Using Distance- and Density-Based Affinity Measures", *Lecture Notes in Computer Science*, pp. 253–261, 2016.
280. Pandian, G. P., G. K. Ramaswami, M. Hodkiewicz, E. Cripps, and M. Pecht. "Long-term Reliability of Lead-free Electronic Systems," *23rd International Symposium on The Physical and Failure Analysis of Integrated Circuits*, Singapore, July 20, 2016.
281. Monoharan, S., G. K. Ramaswami, F. P. McCluskey, and M. Pecht. "Failure Mechanism in Encapsulated Copper Wire-bonded Devices," *23rd International Symposium on the Physical and Failure Analysis of Integrated Circuits*, Singapore, July 20, 2016.
282. Li, N., X. Yu, and M. Pecht. "Position and Enforcement Practice of the People's Republic of China's Pharmaceutical Data Exclusivity Protection," *Drug Design, Development and Therapy,* Vol. 10, pp. 2015–2020, June 2016.
283. Jameson, N. J., K. Wang, C. Morillo, M. H. Azarian, and M. Pecht. "Health Monitoring of Solenoid Valve Electromagnetic Coil Insulation under Thermal Deterioration," *Proceedings of MFPT 2016/ISA's 62nd* IIS, Dayton, OH, May 24–26, 2016. Won Best Student Paper Award of Conference (2016).
284. Williard, N., C. Hendricks, B. Sood, J. S. Chung, and M. Pecht. "Evaluation of Batteries for Safe Air Transport," *Energies*, Vol. 9, No. 5, pp. 340–353, May 2016.
285. Wong, E. H., W. D. van Driel, A. Dasgupta, and M. Pecht, "Creep Fatigue Models of Solder Joints: A Critical Review," *Microelectronics Reliability*, Vol. 59, pp. 1–12, April 2016.
286. Kang, M., J.-M. Kim, R. Peng, X. Ma, and M. Pecht. "DWPT-Based Sub-Band Analysis for Fault Detection of Rolling Element Bearings," *Scientific Journal of Information Engineering*, Vol. 6, pp. 1–7, April 2016.
287. Yoon, J. R., E. Baek, H.-K. Kim, M. Pecht, and S. H. Lee. "Critical Dual Roles of Carbon Coating in $H_2Ti_{12}O_{25}$ for Cylindrical Hybrid Supercapacitors," *Carbon*, Vol. 101, pp. 9–15, May 2016.
288. Kang, M., R. Islam, J. Kim, J. Kim, and M. Pecht. "A Hybrid Feature Selection Scheme for Reducing Diagnostic Performance Deterioration Caused by Outliers in Data-Driven Diagnostics," *IEEE Transactions on Industrial Electronics*, vol. 63, no. 5, pp. 3299–3310, 2016.
289. Tian, J., C. Morillo, M. H. Azarian, and M. Pecht. "Motor Bearing Fault Detection Using Spectral Kurtosis-based Feature Extraction Coupled with k-Nearest Neighbor Distance Analysis," *IEEE Trans. Ind. Electron*., Vol. 63, pp. 1793–1803, March 2016.
290. Lee, J.-H., H.-K. Kim, E. Baek, M. Pecht, S.-H. Lee, and Y.-H. Lee. "Improved Performance of Cylindrical Hybrid Supercapacitor using Activated Carbon/ Niobium Doped Hydrogen Titanate," *Journal of Power Sources*, Vol. 301, pp. 348–354, Jan 2016.
291. Wan, Y., H. Huang, D. Das, and M. Pecht. "Thermal Reliability Prediction and Analysis for High-density Electronic Systems Based on the Markov Process," *Microelectronics Reliability*, Vol. 56, pp. 182–188, Jan 2016.
292. Pearl, A., M. Osterman, and M. Pecht. "Evaluation of ENEPIG and Immersion Silver Surface Finishes Under Drop Loading," *Journal of Electronic Materials*, Vol. 45, pp. 391–402, Jan 2016.
293. Charbaji, A., M. Osterman, and M. Pecht. "Influence of Varying H2S Concentrations and Humidity Levels on ImAg and OSP Surface Finishes," *International Journal of Mechanical Engineering and Technology*, Vol. 6, No. 12, pp. 18–29, Dec 2015.
294. Kohani, M. and M. Pecht. "New Minimum Relative Humidity Requirements Are Expected to Lead to More Medical Device Failures," *J. Medical Systems*, Vol. 40, No. 3, pp. 1–6, Dec. 2015.
295. Ning, Y., M. Azarian, and M. Pecht, "Effects of Voiding on Thermo-mechanical Reliability of Copper-filled Microvias: Modeling and Simulation," *IEEE Transactions on Device and Materials Reliability*, Vol. 15, pp. 500–510, Dec. 2015.

296. Williard, N., D. Baek, J. Park, B. Choi, M. Osterman, and M. Pecht. "A Life Model for Supercapacitors," *IEEE Transactions on Device and Materials Reliability*, Vol. 15, pp. 519–528, Dec. 2015.
297. Tessa, L. L., B. P. Sood, and M. G. Pecht. "Field Reliability Estimation for Cochlear Implants," in *IEEE Transactions on Biomedical Engineering*, Vol. 62, No. 8, pp. 2062–2069, Aug. 2015.
298. Fan, J., C. Qian, K.-C. Yung; X. Fan, G. Zhang, and M. Pecht. "Optimal Design of Life Testing for High Brightness White LEDs Using the Six Sigma DMAIC Approach," *IEEE Transactions on Device and Materials Reliability*, Vol. 15, No. 99, pp. 576–587, Dec. 2015.
299. Fan, J., C. Qian, X. Fan, G. Zhang, and M. Pecht. "In-situ Monitoring and Anomaly Detection for LED Packages Using a Mahalanobis Distance Approach," *First International Conference on Reliability System Engineering & Prognostics* and *System Health Management Conference-Beijing* (2015 ICRSE & PHM-Beijing), Beijing, China, Oct. 23, 2015. (Won best paper award)
300. Hendricks, C., N. Williard, S. Mathew, and M. Pecht. "A Failure Modes, Mechanisms, and Effects Analysis (FMMEA) of Lithium-ion Batteries," *Journal of Power Sources*, Vol. 297, pp. 113–120, 2015.
301. Jameson, N., X. Song, and M. Pecht. "Conflict Minerals in Electronic Systems: An Overview and Critique of Legal Initiatives," *Science Engineering Ethics*, Vol. 22, No. 5, pp. 1375–1389, Sep. 2015.
302. F. Zheng, J. Jiang, M. A. Zaidan, W. He, and M. Pecht, "Prognostics of lithium-ion batteries using a deterministic Bayesian approach," in 2015 IEEE Conference on Prognostics and Health Management: Enhancing Safety, Efficiency, Availability, and Effectiveness of Systems Through PHAf Technology and Application, PHM 2015, Sept. 2015.
303. Oh, H., S. Choi, K. Kim, B. D. Youn, and M. Pecht, "An Empirical Model to Describe Performance Degradation for Warranty Abuse Detection in Portable Electronics," *Reliability Engineering & System Safety*, Vol. 142, pp. 92–99, Oct. 2015.
304. Wang, K., J. Tian, M. Pecht, and A. Xu, "A Prognostics and Health Management Method for Instrumentation System Remanufacturing," *2015 IEEE Conference on Technologies for Sustainability*, Ogden, UT, June 30-August 1, 2015.
305. Leng, F., C. M. Tan, and M. Pecht. "Effect of Temperature on the Aging Rate of Li-ion Battery Operating Above Room Temperature," *Scientific Reports*, Vol. 5, Art. No. 12967, Aug. 6, 2015.
306. Wan, Y., H. Huang, and M. Pecht. "Thermal Fatigue Reliability Analysis and Structural Optimization Based on a Robust Method for Microelectronics FBGA Packages," *IEEE Transactions on Device and Materials Reliability*, Vol. 15, No. 2, pp. 206–213, June 2015.
307. Menon, S., X. Jin, T. W. S. Chow, and M. Pecht. "Evaluating Covariance in Prognostic and System Health Management Applications," *Mechanical Systems and Signal Processing*, Vols. 58–59, pp. 206–217, June 2015.
308. Menon, S., E. George, M. Osterman, and M. Pecht. "High Lead (Over 85 %) Solder in the Electronics Industry: RoHS Exemptions and Alternatives," *Journal of Materials Science: Materials in Electronics*, Vol. 26, No. 6, pp. 4021–4030, June 2015.
309. Patil, N., D. Das, and M. Pecht. "Anomaly Detection for IGBTs Using Mahalanobis Distance," *Microelectronics Reliability*, Vol. 55, No. 7, pp. 1054–1059, June 2015.
310. Ma, P., S. Wang, L. Zhao, M. Pecht, X. Su, and Z. Ye. "An Improved Exponential Model for Predicting the Remaining Useful Life of Lithium-ion Batteries," *IEEE Conference on Prognostics and Health Management (PHM), 2015*, pp. 1–6, 22–25 June 2015.
311. Guo, J., Z. Li, and M. Pecht. "A Bayesian Approach for Li-ion Battery Capacity Fade Modeling and Cycles to Failure Prognostics," *Journal of Power Sources*, Vol. 281, pp. 173–184, May 2015.
312. Wang, K., J. Tian, M. Pecht, and A. Xu, "A Prognostics and Health Management Based Method for Refurbishment Decision Making for Electromechanical Systems," *Proceedings of the 15th IFAC Symposium on Information Control Problems in Manufacturing*, Ottawa, Canada, pp. 481–486, May 11–13, 2015.
313. Hendricks, C., W. He, M. Osterman, M. Hurley, S. Fagan, S. Field, W. Hardman, V. Manivannan, and M. Pecht. "An Approach for Assessing Battery State of Health with Limited Data," *The Aircraft Airworthiness and Sustainment Conference*, Baltimore, MD, April 2, 2015.
314. Fan, J., K.-C. Yung, and M. Pecht. "Predicting Long-term Lumen Maintenance Life of LED Light Sources Using a Particle Filter-based Prognostic Approach," *Expert Systems with Applications*, Vol. 42, No. 5, pp. 2411–2420, April 2015.
315. Chang, M.-H., P. Sandborn, M. Pecht, W. K. C. Yung, and W. Wang. "A Return on Investment Analysis of Applying Health Monitoring to LED Lighting Systems," *Microelectronics Reliability*, Vol. 55, Nos. 3–4, pp. 527–537, Feb. 2015.

316. George, E., M. Osterman, and M. Pecht. "An Evaluation of Dwell Time and Mean Cyclic Temperature Parameters in the Engelmaier Model," *Microelectronics Reliability*, Vol. 55, Nos. 3–4, pp. 582–587, Feb. 2015.
317. Jameson, N. J., M. H. Azarian, and M. Pecht, "Fault Diagnostic Opportunities for Solenoid Operated Valves Using Physics-of-Failure Analysis," *Reliability Digest*, Feb. 2015.
318. Oh, H., M. Azarian, C. Morillo, M. Pecht, and E. Rhem. "Failure Mechanisms of Ball Bearings Under Lightly Loaded, Non-accelerated Usage Conditions," *Tribology International*, Vol. 81, pp. 291–299, Jan. 2015.
319. Niu, G., Y. Zhao, M. Defoort, and M. Pecht. "Fault Diagnosis of Locomotive Electro-pneumatic Brake Through Uncertain Bond Graph Modeling and Robust Online Monitoring," *Mechanical Systems and Signal Processing*, Vols. 50–51, pp. 676–692, Jan. 2015.
320. Kwon, D., M. H. Azarian, and M. Pecht. "Remaining Life Prediction of Solder Joints Using RF Impedance Analysis and Gaussian Process Regression," IEEE Transactions on Components, Packaging and Manufacturing Technology, Vol. 5, No. 11, pp. 1602–1609, 2015.
321. Vasan, A., B. Sood, and M. Pecht. "Carbon Footprinting of Electronic Products," *Applied Energy*, Vol. 136, pp. 636–648, Dec. 2014.
322. Bai, G., P. Wang, C. Hu, and M. Pecht. "A Generic Model-free Approach for Lithium-ion Battery Health Management," *Applied Energy*, Vol. 135, pp. 247–260, Dec. 2014.
323. Zhang, W., S. Liu, B. Sun, Y. Liu, and M. Pecht. "A Cloud Model-based Method for the Analysis of Accelerated Life Test Data," *Microelectronics Reliability*, Vol. 55, No. 1, pp. 123–128, Nov. 2014.
324. He, W., N. Williard, C. Chen, and M. Pecht. "State of Charge Estimation for Li-ion Batteries Using Neural Network Modeling and Unscented Kalman Filter-based Error Cancellation," *International Journal of Electrical Power and Energy Systems*, Vol. 62, pp. 783–791, Nov. 2014.
325. Ratzker, M., A. Pearl, M. Osterman, M. Pecht, and G. Milad. "Review of Capabilities of the ENEPIG Surface Finish", *Electronic Materials*, Vol. 43, No. 11, pp. 3885–3897, Nov. 2014.
326. He, Xiaofei., M. H. Azarian and M. Pecht. "Analysis of the Kinetics of Electrochemical Migration on Printed Circuit Boards Using Nernst-Planck Transport Equation," *Electrochimica Acta,* Vol. 142, pp. 1–10, Oct. 2014.
327. Chauhan, P., S. Mathew, M. Osterman, and M. Pecht. "In-situ Interconnect Failure Prediction Using Canaries," *IEEE Transactions on Device and Materials Reliability*, Vol. 14, No. 3, pp. 826–832, Sept. 2014.
328. Chang, M.-H., C. Chen, D. Das, and M. Pecht. "Anomaly Detection of Light-Emitting Diodes Using the Similarity-based Metric Test," *IEEE Transactions on Industrial Informatic*s, Vol. 10, No. 3, pp. 1852–1863, Aug. 2014.
329. R. Bakhshi, M. Azarian, and M. Pecht. "Effects of Voiding on the Degradation of Microvias in High Density Interconnect Printed Circuit Boards Under Thermomechanical Stresses" *IEEE Transactions On Components, Packaging And Manufacturing Technology*, Vol. 4, No. 8, pp. 1374–1379, Aug. 2014.
330. George, E., and M. Pecht, "A Lead-free Transition Plan for Safety and Reliability Critical Products," *International Conference on Challenges in IT, Engineering and Technology* (ICCIET) Phuket, Thailand, July 17–18, 2014.
331. Varde, P. V., J. Tian, and M. Pecht. "Prognostics and Health Management based Refurbishment for Life Extension of Electronic Systems," *IEEE ICIA & ICAL 2014*, Hailar, China, July 26-28, 2014
332. Tian, J., M. H. Azarian, and M. Pecht. "Rolling Element Bearing Fault Detection Using Density-based Clustering," *IEEE Conference on Prognostics and Health Management* (PHM), Spokane, WA, June 22–25, 2014.
333. Shrivastava, A., M. H. Azarian, C. Morillo, B. Sood, and M. Pecht. "Detection and Reliability Risks of Counterfeit Electrolytic Capacitors", *IEEE Transactions on Reliability*, Vol. 63, No. 2, pp. 468–479, June 2014.
334. Fritzler, T., M. Azarian, and M. Pecht. "Scintillation Conditioning of Tantalum Capacitors with Manganese Dioxide Cathodes," *IEEE Transactions on Device and Materials Reliability*, Vol. 14, No. 2, pp. 630–638, June 2014.
335. Pecht, M., and Anwar Mohammed. "Intermittent Failures in Hardware and Software," *International Journal of Electrical Engineering and Technology* (IJEET), Vol. 5, No. 5, pp. 57–73, May 2014.
336. Haddad, G., P. A. Sandborn, and M. G. Pecht, "Using Maintenance Options to Maximize the Benefits of Prognostics for Wind Farms," *Wind Energy*, Vol. 17, pp. 775–791, May 2014.
337. Leng, F., C. M. Tan, M. Pecht, and J. Y. Zhang. "The Effect of Temperature on the Electrochemistry in Lithium-ion Batteries," *3rd International Symposium on Next-Generation Electronics*, Taoyuan, Taiwan, May 7–10, 2014.
338. Jin, X., M. Zhao, T. Chao, and M. Pecht. "Motor Bearing Fault Diagnosis Using Trace Ratio Linear Discriminant Analysis," *IEEE Transactions on Industrial Electronics*, Vol. 61, No. 5, pp. 2441–2451, May 2014.
339. Kirillov, A., S. Kirillov, and M. Pecht. "The Problem of PHM Cloud Cluster in the Context of Development of Self-maintenance and Self-recovery Engineering Systems." *Engineering Asset Management - Systems,*

Professional Practices and Certification. Lecture Notes in Mechanical Engineering. DOI: https://doi.org/10.1007/978-3-319-09507-3_128.

340. Peter, A., M. H. Azarian, M. Pecht., "Step Stress Testing of Electric Double Layer Capacitors," *International Capacitor and Resistor Technology Symposium*, Santa Clara, CA, April 2014.
341. Sun, J., H. Zuo, W. Wang, and M. Pecht. "Prognostics Uncertainty Reduction by Fusing On-line Monitoring Data Based on a State-space-based Degradation model," *Mechnical Systems and Signal Processing*, Vol. 45, No. 2, pp. 396–407, April 2014.
342. Ning, Y., M. Azarian, and M. Pecht. "Simulation of the Influence of Manufacturing Quality on Thermomechanical Stresses of Microvias," *IPC EXPO 2014*, Mar. 23–27, 2014.
343. Chai, F., M. Osterman, and M. Pecht. "Strain-range-based Solder Life Predictions Under Temperature Cycling with Varying Amplitude and Mean," *IEEE Transactions on Device and Materials Reliability*, Vol. 14, No. 1, pp. 351–57, Mar. 2014.
344. Fan, J., K.-C. Yung, and M. Pecht. "Prognostics of Chromaticity State for Phosphor-converted White Light Emitting Diodes Using an Unscented Kalman Filter Approach," *IEEE Transactions on Device and Materials Reliabilit*y, Vol. 14, No. 1, pp. 564–573, Mar. 2014.
345. Bakhshi, R., S. Kunche, and M. Pecht. "Intermittent Failures in Hardware and Software," *Journal of Electronic Packaging*, Vol. 136, No. 1, pp. 1–5, Mar. 2014.
346. Shrivastava, A., S. Bangerth, M. Azarian, C. Morillo, M. Pecht, M. Levin, L. Steinhardt, and A. Callini, "Detection of Capacitor Electrolyte Residues with FTIR in Failure Analysis," *Journal of Materials Science: Materials in Electronics*, Vol. 25, No. 2, pp. 635–644, Feb. 2014.
347. Shrivastava, A., and M. Pecht. "Counterfeit Capacitors in the Supply Chain," *Journal of Materials Science: Materials in Electronics*, Vol. 25, No. 2, pp. 645–652, Feb. 2014.
348. Xing, Y., W. He, and M. Pecht. "State of Charge Estimation of Lithium-ion Batteries Using the Open-circuit Voltage at Various Ambient Temperatures," *Applied Energy*, Vol. 113, pp. 106–115, Jan. 2014. Won the 2015 Applied Energy Award - highly cited research papers.
349. George, E., and M. Pecht. "Tin Whisker Analysis of an Automotive Engine Control Unit," *Microelectronics Reliability*, Vol. 54, No. 1, pp. 214–219, Jan. 2014.
350. Pecht, M. "The Counterfeit Electronics Problem," *Open Journal of Social Sciences*, Vol. 1, No. 7, pp. 12–16, Dec. 2013.
351. He, W., N. Williard, C. Chen, and M. Pecht. "Health Management of Batteries Based on Differential Evolution," *7th International Conference on Software, Knowledge, Information Management, and Applications* (SKIMA 2013), Chiang Mai, Thailand, Dec. 18–20, 2013.
352. Ye, Z. S., Y. Wang, K. L. Tsui, and M. Pecht. "Degradation Data Analysis Using Wiener Processes with Measurement Errors," *IEEE Transactions on Reliability*, Vol. 62, No. 4, pp. 772–780, Dec. 2013.
353. Patil, N., D. Das, E. Scanff, and M. Pecht. "Long Term Storage Reliability of Antifuse Field Programmable Gate Arrays," *Microelectronics Reliability*, Vol. 53, No. 12, pp. 2052–2056, Dec. 2013.
354. Datong, L., Y. Luo, Y. Peng, J. Liu, L. Guo, and M. Pecht. "Lithium-ion Battery Remaining Useful Life Estimation Based on Fusion Nonlinear Degradation AR Model and RPF Algorithm," *Neural Computing and Applications*, Vol. 25, Nos. 3–4, pp. 557–573, Nov. 2013.
355. Dai, J., D. Das, M. Ohadi, and M. Pecht. "Reliability Risk Mitigation of Free Air Cooling Through Prognostics and Health Management," *Applied Energy*, Vol. 111, pp. 104–112, Nov. 2013.
356. Vasan, A., B. Long, and M. Pecht. "Diagnostics and Prognostics Method for Analog Electronic Circuits," *IEEE Transactions on Industrial Electronics*, Vol. 60, No. 11, pp. 5277–5291, Nov. 2013.
357. Wang, D., Q. Miao, and M. Pecht. "Prognostics of Lithium-ion Batteries Based on Relevance Vectors and a Conditional Three-Parameter Capacity Degradation Model," *Journal of Power Sources*, Vol. 239, pp. 253–264, Oct. 2013.
358. Sood, B., M. Osterman, and M. Pecht. "Health Monitoring of Lithium-ion Batteries," *IEEE Symposium on Product Compliance Engineering* (ISPCE), Austin, TX, pp. 1–6, Oct. 7–9 2013.
359. George, E., M. Osterman, M. Pecht, R. Coyle, R. Parker, and E. Benedetto. "Thermal Cycling Reliability of Alternative Low-Silver Tin-based Solders," *46th International Symposium on Microelectronics*, Orlando, FL, Sept. 29–Oct. 3, 2013.
360. Menon, S., A. Pearl, M. Osterman, and M. Pecht. "Effect of ENEPIG Surface Finish on the Vibration Reliability of Solder Interconnects," *46th International Symposium on Microelectronics*, Orlando, FL, Sept 30–Oct. 3, 2013

361. Jin, X., T. W. S. Chow, and M. Pecht. "Online Anomaly Detection of Brushless DC Motor Using Current Monitoring Technique," *Prognostics and System Health Management Conference* (PHM-2013), Milan, Italy, Sept. 8–11, 2013.
362. Krillov, A., S. Krillov, and M. Pecht. "Remote Calculating PHM Cluster: The First Results," *Prognostics and System Health Management Conference* (PHM-2013), Milan, Italy, Sept. 8–11, 2013.
363. Raveendran, R. K. S., M. Azarian, N. H. Kim, and M. Pecht. "Effect of Multiple Faults and Fault Severity on Gearbox Fault Detection in a Wind Turbine Using Electrical Current Signals," *Prognostics and System Health Management Conference* (PHM-2013), Milan, Italy, Sept. 8–11, 2013.
364. Williard, N., W. He, C. Hendricks, and M. Pecht. "Lessons Learned from the 787 Dreamliner on Lithium-ion Battery Reliability," *Energies*, Vol. 6, No. 9, pp. 4682–4695, Sept. 2013.
365. Song, X., M. H. Chang, and M. Pecht, "Rare-Earth Elements in Lighting and Optical Applications and Their Recycling," *Journal of the Minerals, Metals & Materials Society* (JOM), Vol. 65, No. 10, pp. 1276–1282, Aug. 2013.
366. Chauhan, P., Z. W. Zhong, and M. Pecht. "Copper Wire Bonding Concerns and Best Practices," *Journal of Electronic Materials*, Vol. 42, No. 8, pp. 2415–2434, Aug. 2013.
367. Tamilselvan, P., P. Wang, and M. Pecht. "A Multi-attribute Classification Fusion System for Insulated Gate Bipolar Transistor Diagnostics," *Microelectronics Reliability*, Vol. 53, No. 8, pp. 1117–1129, Aug. 2013.
368. Srivinas, V., S. Menon, M. Osterman, and M. Pecht. "Modeling the Rate Dependent Durability of Reduced-Ag SAC Interconnects for Area Array Packages Under Torsion Loads," *Journal of Electronic Materials*, Vol. 42, No. 8, pp. 2606–2614, July 2013.
369. Chauhan, P., S. Mukherjee, M. Osterman, A. Dasgupta, and M. Pecht. "Effect of Isothermal Aging on Microstructure and Creep Properties of SAC305 Solder: A Micromechanics Approach," *International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems* (InterPACK2013), Burlingame, CA, July 16–18, 2013.
370. Tian, J., M. Pecht, L. Yang, and Q. Miao. "A K-Means Clustering Based Method in Rolling Element Bearing Fault Detection," *International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering* (QR2MSE2013) & *International Conference on Materials and Reliability* (ICMR 2013), Sichuan, China, July 15–18, 2013.
371. Vasan, A., M. Pecht, and B. Long. "Health Assessment of Electronic Systems," *International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering* (QR2MSE2013) & *International Conference on Materials and Reliability* (ICMR 2013), Sichaun, China, July 15–18, 2013.
372. Pecht, M. "Battery Reliability of Electric Vehicles," *Mathematical Methods in Reliability Conference* (MMR 2013), Stellenbosch, South Africa, July 1–4, 2013.
373. Vasan, A., C. Chen, and M. Pecht. "Circuit-centric Approach for Electronic System-level Prognostics," *IEEE Conference on Prognostics and Health Management* (PHM), Gaithersburg, MD, June 24–27, 2013.
374. Sreenilayam-Raveendram, R.-K., M. Azarian, and M. Pecht. "Detection of Under-lubricated Ball Bearings Using Vibration Signals," *IEEE Conference on Prognostics and Health Management* (PHM), Gaithersburg, MD, June 24–27, 2013.
375. Tian, J., C. Morillo, and M. Pecht. "Rolling Element Bearing Fault Diagnosis Using Simulated Annealing Optimized Spectral Kurtosis," *IEEE Conference on Prognostics and Health Management* (PHM), Gaithersburg, MD, pp. 1–5, June 24–27 2013.
376. Kumar, R., M. Azarian, E. Rhem, and M. Pecht. "Classification of Lubricant Level in Ball Bearings Using Vibration Signals," *IEEE Conference on Prognostics and Health Management* (PHM), Gaithersburg, MD, Jun. 24–27, 2013.
377. Liu, D., P. J. Yue, Z. J. Bao, Y. Peng, and M. Pecht. "Prognostics for State-of-Health Lithium-ion Battery Based on Combination Gaussian Process Functional Regression," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 832–839, June 2013. {Top 5 most highly cited articles in Microelectronics Reliability for each year 2014, 2015, 2016}.
378. He, W., N. Williard, C. Chen, and M. Pecht. "State of Change Estimation for Electric Vehicle Batteries Using Unscented Kalman Filtering," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 840–847, June 2013.
379. Chen, Y., Q. Miao, B. Zheng, S. Wu, and M. Pecht, "Quantitative Analysis of Lithium-ion Battery Capacity Prediction via Adaptive Bathtub-shaped Function," *Energies*, Vol. 6, No. 6, pp. 3082–3096, June 2013.
380. Miao, Q., L. Xie, H. Cui, W. Liang, and M. Pecht, "Remaining Useful Life Prediction of Lithium-ion Battery with Unscented Particle Filter Technique," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 805–810, June 2013.
381. Xing, Y., E. W. M. Ma, K.-L. Tsui, and M. Pecht, "An Ensemble Model for Predicting the Remaining Useful Performance of Lithium-ion Batteries," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 811–820, June 2013.

382. Alam, M., M. Azarian, and M. Pecht, "Modeling the Electrical Conduction in Epoxy-$BaTiO_3$ Nanocomposites," *Journal of Electronic Materials*, Vol. 42, No. 6, pp. 1101–1107, Jun. 2013.
383. Raveendran, R. K. S., M. Azarian, N. H. Kim, and M. Pecht, "Effect of Multiple Faults and Fault Severity on Gearbox Fault Detection in a Wind Turbine Using Electrical Current Signals," *Chemical Engineering Transactions*, Vol. 33, pp. 79–84, 2013.
384. Choi, S., B. D. Youn, and M. Pecht, "A Liquid Contact Indicator Model for Warranty Abuse Detection in Portable Electronics," *Proceedings of the 2013 IEEE International Conference on Prognostics and Health Management* (PHM), Gaithersburg, MD, pp. 1–8, June 2013.
385. Ye, H., S. Xue, and M. Pecht, "Effects of Thermal Cycling on Rare Earth (Pr)-induced Sn Whisker/Hillock Growth," *Materials Letters*, Vol. 98, No. 1, pp. 78–81, May 2013.
386. Kumar, R., M. Azarian, C. Morillo, M. Pecht, K. Kida, E. Santos, T. Honda, and H. Koike, "Comparative Evaluation of Metal and Polymer Ball Bearings," *Wear*, Vol. 302, Nos. 1–2, pp. 1499–1505, Apr.–May 2013.
387. Cong, F., J. Chen, G. Dong, and M. Pecht, "Vibration model of rolling element bearings in a rotor-bearing system for fault diagnosis," *Journal of Sound and Vibration*, Vol. 332, No. 8, pp. 2081–2097, Apr. 2013.
388. Chauhan, P., M. L. Wu, M. Osterman, and M. Pecht, "Evolution of Bulk and Interfacial Microstructure of SAC305 and SN100C Solders on ENIG/Cu Pads Under Isothermal Aging," *Internationl Conference on Electronics Packaging* (ICEP), Osaka, Japan, Apr. 10–12, 2013.
389. Moriyama, M., M. Azarian, and M. Pecht, "Failure Mode Analysis of Electrical Double Layer Capacitors," *Internationl Conference on Electronics Packaging* (ICEP), Osaka, Japan, Apr. 10–12, 2013.
390. Roller, J., B. Sood, and M. Pecht, "Reliability of Electroless Nickel Immersion Gold Finishes," *Internationl Conference on Electronics Packaging* (ICEP), Osaka, Japan, Apr. 10–12, 2013.
391. Yin, L., S. Wei, Z. Xu, Y. Geng, D. Das, and M. Pecht, "The Effect of Joint Size on the Creep Properties of Microscale Lead-free Solder Joints at Elevated Temperatures," *Journal of Materials Science: Materials in Electronics*, Vol. 24, No. 4, pp. 1369–1374, Apr. 2013. (see "Erratum," Vol. 24, No. 7, July 2013).
392. Oh, Hyunseok, M. H. Azarian, and D. Das, "A Critique of the IPC-9591 Standard: Performance Parameters for Air Moving Devices," *IEEE Transactions on Device and Materials Reliability*, Vol. 13, No. 1, pp. 146–155, Mar. 2013.
393. Wang, Y., Q. Miao, E. W. M. Ma, K.-L. Tsui, and M. Pecht, "Online Anomaly Detection for Hard Disk Drives Based on Mahalanobis Distance," *IEEE Transactions on Reliability*, Vol. 62, No. 1, pp. 136–145, Mar. 2013.
394. Williard, N., W. He, M. Osterman, and M. Pecht, "Comparative Analysis of Features for Determining State of Health in Lithium-ion Batteries," *International Journal of the PHM Society, Special Issue: Battery Management*, Vol. 4, No. 1, pp. 1–7, Mar. 2013.
395. Challa, V., P. Rundle, and M. Pecht, "Challenges in the Qualification of Electronic Components and Systems," *IEEE Transactions on Device and Materials Reliability*, Vol. 13, No. 1, pp. 26–35, Mar. 2013.
396. Kunche, S., C. Chen, and M. Pecht, "Optimized Diagnostic Model Combination for Improving Diagnostic Accuracy," *IEEE Aerospace Conference*, Big Sky, MT, Mar. 2–9, 2013.
397. Dorj, E., C. Chen, and M. Pecht, "A Bayesian Hidden Markov Model-based Approach for Anomaly Detection in Electronic Systems," *IEEE Aerospace Conference*, Big Sky, MT, Mar. 2–9, 2013.
398. Song, B., M. Azarian, and M. Pecht, "Effect of Temperature and Relative Humidity on the Impedance Degradation of Dust-contaminated Electronics," *Journal of the Electrochemical Society*, Vol. 160, pp. C97–C105, 2013.
399. Miao, Q., C. Tang, W. Liang, and M. Pecht, "Health Assessment of Cooling Fan Bearing Using Wavelet-based Filtering," *Sensors*, Vol. 13, pp. 274–291, 2013.
400. Vasan, A., D. Mahadeo, R. Doraiswami, Y. Huang, and M. Pecht, "Point-of-Care Biosensor System," *Frontiers in Bioscience*, Scholar, Vol. 5S, pp. 39–71, Jan. 2013.
401. Li, B., X. P. Zhang, Y. Yang, L. M. Yin, and M. Pecht, "Size and Constraint Effects on Interfacial Fracture Behavior of Microscale Solder Interconnects," *Microelectronics Reliability*, Vol. 53, No. 1, pp. 154–163, Jan. 2013.
402. Song, X., L. Zuga, and M. Pecht, "The National Computer Quality Supervising Center (NCTC): A Core Chinese Dual Use Technology Capability," *Second Line of Defense*, Jan. 2013. http://www.sldinfo.com/the-national-computer-quality-supervising-center-nctc-a-core-chinese-global-capability-part-i/
403. Shi, H., C. Tian, M. Pecht, and T. Ueda, "Polymeric Reinforcement Approaches and Materials Selection to Improve Board-level Drop Reliability of SnAgCu Soldered Area Array Packages," *14th Electronics Packaging Technology Conference*, Singapore, Dec. 5–7, 2012.

404. Shi, H., C. Tian, M. Pecht, and T. Ueda, "Board-level Shear, Bend, Drop, and Thermal Cycling Reliability of Lead-free Chip Scale Packages with Partial Underfill: A Low-cost Alternative to Full Underfill," *14th Electronics Packaging Technology Conference*, Singapore, Dec. 5–7, 2012.
405. Dai, J., D. Das, and M. Pecht, "A Multiple Stage Approach to Mitigate the Risks of Telecommunication Equipment Under Free Air Cooling Conditions," *Energy Conversion and Management*, Vol. 64, pp. 424–432, Dec. 2012.
406. Varde, P. V., and M. Pecht, "Role of Prognostics in Support of Integrated Risk-based Engineering: A Review in Respect of Nuclear Power Plant Safety," *International Journal of the PHM Society*, Vol. 3, No. 1, pp. 1–23, 2012.
407. Haddad, G., P. Sandborn, and M. Pecht, "An Options Approach for Decision Support of Systems with Prognostic Capabilities," *IEEE Transactions on Reliability*, Vol. 61, No. 4, pp. 872–883, Dec. 2012.
408. Xing, Y., E. Ma, and M. Pecht, "Model-based Prediction for Battery Remaining Useful Life," *APARM 2012*, Nanjing, China, Nov. 1–3, 2012.
409. Dai, J., D. Das, and M. Pecht, "Prognostics-based Risk Mitigation for Telecom Equipment Under Free Air Cooling Conditions," *Applied Energy*, Vol. 99, pp. 423–429, Nov. 2012.
410. A. Kirillov, S. Kirillov, M. Pecht. "The calculating PHM cluster: CH&P mathematical models and algorithms of early prognosis of failure." *Prognostics and System Health Management (PHM), 2012 IEEE Conference.* July 2, 2012. DOI: 10.1109/PHM.2012.6228771.
411. Alam, M., M. Azarian, and M. Pecht, "Highly Accelerated Life Testing of Embedded Planar Capacitors with Epoxy-$BaTiO_3$ Nanocomposite Dielectric," *IEEE Transations on Components, Packaging and Manufacturing Technology*, Vol. 2, No. 10, pp. 1580–1586, Oct. 2012.
412. George, E., M. Osterman, M. Pecht, and R. Coyle, "Effects of Extended Dwell Time on Thermal Fatigue Life of Ceramic Chip Resistors," *45th International Symposium on Microelectronics*, San Diego, CA, Sep. 13, 2012.
413. Liu, D., Y. Luo, Y. Peng, X. Peng, and M. Pecht, "Lithium-ion Battery Remaining Useful Life Estimation Based on Nonlinear AR Model Combined with Degradation Feature," *Annual Conference of the Prognostics and Health Management Society*, Vol. 3, pp. 1–7, Sep. 2012.
414. Pecht, M., and L. Zuga, "U.S. Intelligence Must Boost S&T Sources, Analysis as China Rises," *Aol Defense*, Sep. 24, 2012. **http://defense.aol.com/2012/09/24/us-intelligence-agencies-must-boost-sandt-sources-analysis-as-chi/**
415. Y. Xing, E. W. M. Ma, K. L. Tsui, and M. Pecht, "Influence of parameter initialization on battery life prediction for online applications," in ICEPT-HDP 2012 Proceedings - 2012 13th International Conference on Electronic Packaging Technology and High Density Packaging, Aug. 2012, pp. 1042–1046.
416. Williard, N., W. He, C. Wang, and M. Pecht, "Reliability and Failure Analysis of Lithium Ion Batteries for Electronic Systems," *International Conference on Electronic Packaging Technology and High Density Packaging* (ICEPT-HDP), Guilin, China, Aug. 2012.
417. Jin, X., E. Ma, L. Cheng, and M. Pecht, "Health Monitoring of Cooling Fans Based on Mahalanobis Distance with mRMR Feature Selection," *IEEE Transactions on Instrumentation and Measurement*, Vol. 61, No. 8, pp. 2222–2229, Aug. 2012.
418. Stradley, J., and M. Pecht, "The Electronics Counterfeiting Problem," *Circuit World*, Vol. 38, No. 3, pp. 163–168, Aug. 2012.
419. Cheng, S., and M. Pecht, "Using Cross-validation for Model Parameter Selection of Sequential Probability Ratio Test," *Expert Systems with Applications*, Vol. 39, pp. 8467–8473, July 2012.
420. Han, S., M. Osterman, S. Meschter, and M. Pecht, "Evaluation of Effectiveness of Conformal Coatings as Tin Whisker Mitigation," *Journal of Electronic Materials*, Vol. 14, No. 9, pp. 2508–2518, July 2012.
421. Cheng, S., K. Tom, and M. Pecht, "Failure Causes of a Polymer Resettable Circuit Protection Device," *Journal of Electronic Materials*, Vol. 41, No. 9, pp. 2419–2430, Jun. 2012.
422. Alam, M., M. Azarian, M. Osterman, and M. Pecht, "Accelerated Temperature and Voltage Stress Tests of Embedded Planar Capacitors with Epoxy $BaTiO_3$ Composite Dielectric," *Journal of Electronic Packaging*, Vol. 134, No. 2, pp. 021009-1–021009-8, Jun. 2012.
423. Sun, B., S. Zeng, R. Kang, and M. Pecht, "Benefits and Challenges of System Prognostics," *IEEE Transactions on Reliability*, Vol. 61, No. 2, pp. 323–335, Jun. 2012.
424. Wang, W., M. Pecht, and Y. Liu, "Cost Optimization for Canary-Equipped Electronic Systems in Terms of Inventory Control and Maintenance Decisions," *IEEE Trans. on Reliability*, Vol. 61, No. 2, pp. 466–478, Jun. 2012.
425. Wang, W., M.J. Carr, T.W.S. Chow, and M. Pecht, "A Two-Level Inspection Model with Technological Insertions," *IEEE Trans. on Reliability*, Vol. 61, No. 2, pp. 479–490, Jun. 2012.

426. Wang, W., S. Luo, and M. Pecht, "Economic Design of the Mean Prognostic Distance for Canary-Equipped Electronic Systems," *Microelectronics Reliability*, Vol. 52, No. 6, pp. 1086–1091, Jun. 2012.
427. Cheng, S., K. Tom, and M. Pecht, "Anomaly Detection of Polymer Resettable Circuit Protection Devices," *IEEE Trans. on Device and Materials Reliability*, Vol. 12, No. 2, pp. 420–427, Jun. 2012.
428. Chai, F., M. Osterman, and M. Pecht, "Reliability of Gull-Wing and Leadless Packages Subjected to Temperature Cycling after Rework," *IEEE Trans. on Device and Materials Reliability*, Vol. 12, No. 2, pp. 510–517, Jun. 2012.
429. Pecht, M., "Nvidia's GPU Failures: A Case for Prognostics and Health Management," *Microelectronics Reliability*, Vol. 52, No. 6, pp. 953–957, Jun. 2012.
430. Fan, J., K-C Yung, and M. Pecht, "Lifetime Estimation of High-Power White LED using Degradation-Data-Driven Method," *IEEE Trans. on Device and Materials Reliability*, Vol. 12, No. 2, pp. 470–477, Jun. 2012.
431. Huang, Y., A.S.S. Vasan, R. Doraiswami, M. Osterman, and M. Pecht, "MEMS Reliability Review," *IEEE Trans. on Device and Materials Reliability*, Vol. 12, No. 2, pp. 482–493, Jun. 2012.
432. Mathew, S., M. Osterman, and M. Pecht, "A Canary Device Based Approach for Prognosis of Ball Grid Array Packages," *2012 IEEE Conf. on Prognostics and Health Management*, Denver, CO, Jun. 18–21, 2012.
433. Kumar, R., M. Azarian, M. Pecht, and N.H. Kim, "Gear Fault Diagnosis using Electrical Signals and its Application to Wind Power Systems," *2012 IEEE Conf. on Prognostics and Health Management*, Denver, CO, Jun. 18–21, 2012.
434. Sutrisno, E., H. Oh, A.S.S. Vasan, and M. Pecht, "Estimation of Remaining Useful Life of Ball Bearings using Data Driven Methodologies," *2012 IEEE Conf. on Prognostics and Health Management*, Denver, CO, Jun. 18–21, 2012.
435. Pecht, M. and L. Zuga, "U.S. Companies- Not China- Pose the Real Counterfeit Parts Problem," *Aol Defense*, Jun. 1, 2012. http://defense.aol.com/2012/06/01/u-s-companies-not-china-pose-the-real-counterfeit-parts-p/
436. Sutrisno, E., Q. Fan, D. Das, and M. Pecht, "Anomaly Detection for Insulated Gate Bipolar Transistor (IGBT) under Power Cycling using Principal Component Analysis and K-Nearest Neighbor Algorithm," *Journal of the Washington Academy of Sciences*, Vol. 98, No. 1, pp. 1–8, May 2012.
437. Alam, M., L. Zuga, and M. Pecht, "Economics of Rare Earth Elements in Ceramic Capacitors," *Ceramics International*, Vol. 38, pp. 6091–6098, May 2012.
438. Fortier, A. and M. Pecht, "Comparative Study of Metal Films and their Affinity for Tin Whisker Growth," *IEEE Transactions on Components, Packaging and Manufacturing Tech.*, Vol. 2, No. 5, pp. 739–747, May 2012.
439. Huang, Y., M. Osterman, M. Pecht, "A Novel Electrostatic Radio Frequency Micro Electromechanical Systems with Prognostics Function," *2012 IEEE 62nd Electronic Components and Technology Conference* (ECTC), pp. 121–126, May 29– Jun 3, 2012
440. Wang, Y., E. W. M. Ma, K. L. Tsui, and M. Pecht, "A Fusion Approach for Anomaly Detection in Hard Disk Drives," *Proc. of IEEE 2012 Prognostics and System Health Management Conference*, Beijing, May 23–25, 2012.
441. Long, B., H. Wang, Q. Miao, and M. Pecht, "A Prognostics and Health Management Strategy for Complex Electronic Systems," *Proc. of IEEE 2012 Prognostics and System Health Management Conference*, Beijing, May 23–25, 2012.
442. Jin, X., E. W. M. Ma, T. W. S. Chow, and M. Pecht, "An Investigation into Fan Reliability," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.
443. Xie, L., Q. Miao, Y. Chen, W. Liang, and M. Pecht, "Fan Bearing Fault Diagnosis Based on Continuous Wavelet Transform and Autocorrelation," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM–2012 Beijing), Beijing, May 23–25, 2012.
444. Ma, E. W. M., T. W. S. Chow, and M. Pecht, "Evaluating Nominal Parameters in Fault Diagnosis," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.
445. Xing, Y., E. W. M. Ma, K. L. Tsui, and M. Pecht, "A Case Study on Battery Life Prediction using Particle Filtering," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.
446. He, W., N. Williard, C. Chen, and M. Pecht, "State of Charge Estimation for Electric Vehicle Batteries under an Adaptive Filtering Framework," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.
447. Cui, H. J., Q. Miao, W. Liang, Z. Wang, and M. Pecht, "Application of Unscented Particle Filter in Remaining Useful Life Prediction of Lithium-ion Batteries," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.

448. Chen, C. and M. Pecht, "Prognostics of Lithium-Ion Batteries Using Model-Based and Data-Driven Methods," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.
449. Chauhan, P., M. Osterman, M. Pecht, and Q. Yu, "Use of Temperature as a Health Monitoring Tool for Solder Interconnect Degradation in Electronics," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.
450. Rundle, P., Y. Ning, and M. Pecht, "Health Monitoring Based Reliability," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012
451. Lau, B. C. P., E. W. M. Ma, and M. Pecht, "Review of Offshore Wind Turbine Failures and Fault Prognostic Methods," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.
452. Fan, J., K. C. Yung, and M. Pecht, "Comparison of Statistical Models for the Lumen Lifetime Distribution of High Power White LEDs," *Proc. of IEEE 2012 Prognostics and System Health Management Conference* (PHM-2012 Beijing), Beijing, May 23–25, 2012.
453. Chang, M. H., D. Das, P. V. Varde, and M. Pecht, "Light Emitting Diodes Reliability Review," *Microelectronics Reliability*, Vol. 52, No. 5, pp. 762–782, May 2012.
454. DiMaio, F., J. Hu, P. Tse, K. Tsui, E. Zio, and M. Pecht, "Ensemble-Approaches for Clustering Health Status of Oil Sand Pumps," *Expert Systems with Applications*, Vol. 39, No. 5, pp. 4847–4859, April 2012.
455. Pecht, M., and L. Zuga, "Counterfeit Electronics and the China Connection," *SMT Magazine*, pp. 38–44, April 2012.
456. Alam, M., M. Azarian, and M. Pecht, "Embedded Capacitors in Printed Wiring Board: A Technological Review," *Journal of Electronic Materials*, Vol. 41, No. 6, pp. 2286–2303, April 2012.
457. Sun, J., H. Zuo, W. Wang, and M. Pecht, "Application of a State Space Modeling Technique to System Prognostics based on a Health Index for Condition-based Maintenance," *Mechanical Systems and Signal Processing*, Vol. 28, pp. 585–596, April 2012.
458. Wu, M. L., E. George, and M. Pecht, "Simulation Assisted Physics of Failure based Reliability Assessment," *ICEP-IAAC 2012 Conference*, Tokyo, Japan, April 17–20, 2012.
459. Chauhan, P., M. Osterman, and M. Pecht, "Canary Approach for Monitoring BGA Interconnect Reliability under Temperature Cycling," *MFPT 2012: The Prognostics and Health Management Solutions Conference*, Dayton, OH, April 24–26, 2012. (Won best student paper of conference award)
460. Kunche, S., C. Chen, and M. Pecht, "A Review of PHM System's Architectural Frameworks," *MFPT 2012: The Prognostics and Health Management Solutions Conference*, Dayton, OH, April 24–26, 2012.
461. Sutrisno, E., Q. Fan, D. Das, C. Chan, and M. Pecht, "Anomaly Detection for Insulated Gate Bipolar Transistor (IGBT) Under Power Cycling Using a K-Nearest Neighbor Technique," *MFPT 2012: The Prognostics and Health Management Solutions Conference*, Dayton, OH, April 24–26, 2012.
462. Tian, J., C. Li, and M. Pecht, "Diagnosis of Rolling Element Bearing Fault in Bearing-Gearbox Union System using Wavelet Packet Correlation Analysis," *MFPT 2012: The Prognostics and Health Management Solutions Conference*, Dayton, OH, April 24–26, 2012.
463. Williard, N., H. Wei, and M. Pecht, "Model Based Battery Management System for Condition Based Maintenance," *MFPT 2012: The Prognostics and Health Management Solutions Conference*, Dayton, OH, April 24–26, 2012.
464. Campbell, P. E., and M. Pecht, "The Emperor's New Clothes: Intellectual Property Protections in China," *Journal of Business & Technology Law*, Vol. 7, No. 1, pp. 75–125, March 2012.
465. Dai, J., D. Das, M. Pecht, and M.M. Ohadi, "A Case Study on Impact of Free Air Cooling on Performance of Telecom Equipment," *Proc. of SemiTherm*, San Jose, CA, March 18–22, 2012.
466. Ohadi, M. M., S. V. Dessiatoun, K. Choo, M. Pecht, and J. V. Lawler, "A Comparison Analysis of Air, Liquid, and Two-Phase Cooling of Data Centers," *Annual IEEE Semiconductor Thermal Measurement and Management Symposium*, San Jose, CA, pp. 58–63, March 18–22, 2012.
467. Si, X.-S., W. Wang, C.-H. Hu, D.-H. Zhou, and M. Pecht, " a Nonlinear Diffusion Degradation Process," *IEEE Transactions on Reliability*, Vol. 61, No. 1, pp. 50–67, March 2012.
468. Elerath, J., and M. Pecht, "IEEE 1413: A Standard for Reliability Predictions," *IEEE Transactions on Reliability*, Vol. 61, No. 1, pp. 125–129, March 2012.
469. Alam, M. A., M. H. Azarian, and M. Pecht, "Reliability of Embedded Planar Capacitors with Epoxy-$BaTiO_3$ Composite Dielectric During Temperature-Humidity-Bias Tests," *IEEE Transactions on Device and Materials Reliability*, Vol. 12, No. 1, pp. 86–93, March 2012.

470. Sun, J., S. Cheng, and M. Pecht, "Prognostics of Multilayer Ceramic Capacitors Via the Parameter Residuals," *IEEE Transactions on Device and Materials Reliability*, Vol. 12, No. 1, pp. 49–57, March 2012.
471. Patil, N., D. Das, and M. Pecht, "A Prognostic Approach for Non-punch through and Field Stop IGBTs," *Microelectronics Reliab*ility, Vol. 52, No. 3, pp. 482–488, March 2012.
472. Song, B., M. H. Azarian, and M. Pecht, "Impact of Dust on Printed Circuit Assembly Reliability," *IPC APEX EXPO*, San Diego, CA, February 29, 2012.
473. Kumar, S., N. M. Vichare, E. Dolev, and M. Pecht, "A Health Indicator Method for Degradation Detection of Electronic Products," *Microelectronics Reliability*, Vol. 52, No. 2, pp. 439–445, Feb. 2012.
474. He, X., M. Azarian, M. Kostinovsky, and M. Pecht, "An Evaluation of the Insulation Resistance and Surface Contamination of Printed Circuit Board Assemblies," *Proc. of IPC Apex Expo Conf.*, San Diego, CA, Feb. 2012.
475. Alam, M. A., M. H. Azarian, and M. Pecht, "Effects of Moisture Absorption on the Electrical Parameters of Embedded Capacitors with Epoxy-$BaTiO_3$ Nanocomposite Dielectric," *Journal of Materials Science: Materials in Electronics*, Vol. 23, No. 1, pp. 1504–1510, Jan. 2012.
476. Mathew, S., A. Alam, and M. Pecht, "Identification of Failure Mechanisms to Enhance Prognostic Outcomes," *Journal of Failure Analysis and Prevention*, Vol. 12, No. 1, pp. 66–73, 2012; updated of Mathew, S., M. Alam, and M. Pecht, "Identification of Failure Mechanisms to Enhance Prognostic Outcomes," *MFPT: The Applied Systems Health Management Conf.*, Virginia Beach, VA, May 10–12, 2011.
477. Gray, K., and M. Pecht, "Long-term Thermal Overstressing of Computers," *IEEE Design & Test of Computers*, Vol. 28, No. 6, pp. 58–64, Nov./Dec. 2011.
478. He, W., N. Williard, M. Osterman, and M. Pecht, "Prognostics of Lithium-ion Batteries Based on Dempster-Shafer Theory and the Bayesian Monte Carlo Method," *Journal of Power Sources*, No. 196, pp. 10314–10321, Dec. 2011.
479. Woo, S. W., J. Park, and M. Pecht, "Reliability Design and Case Study of Refrigerator Parts Subjected to Repetitive Loads under Consumer Usage Conditions," *Engineering Failure Analysis*, Vol. 18, No. 7, pp. 1818–1830, Oct. 2011.
480. Xing, Y., E. W. M. Ma, K. L. Tsui, and M. Pecht, "Battery Management Systems in Electric and Hybrid Vehicles," *Energies*, Vol. 4, No. 11, pp. 1840–1857, Oct. 2011.
481. Haddad, G., P. Sandborn, and M. Pecht, "Determining a Dynamic Maintenance Threshold Using Real Options," *Proc. of WCEAM 2011*, Cincinnati, OH, Oct. 3–5, 2011.
482. Vasan, A. S. S., B. Long, and M. Pecht, "Experimental Validation of LS-SVM Based Fault Identification in Analog Filter Circuits Using Frequency Features," *Proc. of WCEAM 2011*, Cincinnati, OH, Oct. 3–5, 2011.
483. Menon, S., E. George, M. Osterman, and M. Pecht, "Physics of Failure Based Reliability Assessment of Electronic Hardware," *Proc. of WCEAM 2011*, Cincinnati, OH, Oct. 2–5, 2011.
484. Azarian, M., M. Alam, and M. Pecht, "The Effect of Physical Dimensions of an Embedded Planar Capacitor on Reliability," *SMTA International*, Fort Worth, TX, Oct. 2011.
485. Sood, B., D. Das, and M. Pecht, "Screening for Counterfeit Electronic Parts," *Journal of Material Sciences, Material Electronics*, Vol. 22, (Failure Analysis in Electronics; an EDFAS Special Issue) pp. 1511–1522, Oct. 2011.
486. Sood, B., and M. Pecht, "Conductive Filament Formation in Printed Circuit Boards: Effects of Reflow Conditions and Flame Retardants," *Journal of Material Sciences, Material Electronics*, Vol. 22, (Failure Analysis in Electronics; an EDFAS Special Issue) pp. 1602–1615, Oct. 2011.
487. Williard, N., B. Sood, M. Osterman, and M. Pecht, "Disassembly Methodology for Conducting Failure Analysis on Lithium-ion Batteries," *Journal of Material Sciences, Material Electronics*, Vol. 22, (Failure Analysis in Electronics; an EDFAS Special Issue) pp. 1616–1630, Oct. 2011.
488. Kumar, R., M. Azarian, M. Pecht, and N.-H. Kim, "Gear Fault Diagnosis using Electrical Signals and its Application to Wind Power Systems," *AWEA Offshore Windpower Conference and Exhibition*, Baltimore, MD, Oct. 11–13, 2011.
489. Kumar, R., M. Azarian, N.-H. Kim, and M. Pecht, "Identifying Failed Components from System-level Signals in a Wind Turbine," *AWEA Offshore Windpower Conference and Exhibition*, Baltimore, MD, Oct. 11–13, 2011.
490. Haddad, G., P. A. Sandborn, T. Jazouli, M. Pecht, B. Foucher, and V. Rouet, "Guaranteeing High Availability of Wind Turbines," *2011 ESREL Conference*, Troyes, France, Sept. 18–22, 2011.
491. Long, B., S. Tian, Q. Miao, and M. Pecht, "Research on Features for Diagnostics of Filtered Analog Circuits Based on LS-SVM," *Proc. of Autotestcon 2011*, Baltimore, MD, pp. 360–366, Sept. 12–15, 2011.

492. Vasan, A., and M. Pecht, "Investigation of Stochastic Differential Models and a Recursive Nonlinear Filtering Approach for Fusion-prognostics," *Annual Conference of the Prognostics and Health Management Society*, 2011, Sept. 25–29, 2011
493. Zhang, S., R. Kang, and M. Pecht, "Corrosion of ImAg-Finished PCBs Subjected to Elemental Sulfur Environments," *IEEE Transactions on Device and Materials Reliability*, Vol. 11, No. 3, pp. 391–400, Sept. 2011.
494. Fan, J., K.C. Yung, and M. Pecht, "Physics-of-Failure-Based Prognostics and Health Management for High-Power White Light-Emitting Diode Lighting," *IEEE Transactions on Device and Materials Reliability*, Vol. 11, No. 3, pp. 407–416, Sept. 2011.
495. Alam, M., M. H. Azarian, M. Osterman, and M. Pecht, "Prognostics of Failures in Embedded Planar Capacitors using Model-based and Data-Driven Approaches," *Journal of Intelligent Material Systems and Structures*, Vol. 22, pp. 1293–1304, Oct. 2011.
496. Zuga, L., M. Pecht, and P. Wang, "Prognostics and Health Management Based Health Care Robotics," *Proc. of the Association of Unmanned Systems Conference*, Las Vegas, NV, Aug. 22, 2011.
497. Tiku, S., and M. Pecht, "Counterfeit Products: Strategies for Military Systems," *SMT Magazine*, pp. 14–23, Aug. 2011.
498. Wang, W., Y. Liu, and M. Pecht, "A Theoretical Model to Minimize the Operational Cost for Canary-equipped Electronic System's Health Management," *Intl. Symposium on System Informatics and Engineering* (ISSIE 2011), July 11–13, 2011.
499. Shen, D., S. Zhang, and M. Pecht, "Design on Logic Processes of PHM for Avionics System," *Intl. Symposium on System Informatics and Engineering* (ISSIE 2011), July 11–13, 2011.
500. Xing, Y., Q. Miao, K.-L. Tsui, and M. Pecht, "Research on Prognostics-based Reliability for Lithium-ion Batteries," *Intl. Symposium on System Informatics and Engineering* (ISSIE 2011), July 11–13, 2011.
501. Wang, W., Y. Liu, and M. Pecht, "A Theoretical Model to Minimize the Operational Cost for Canary-equipped Electronic System's Health Management," *Intl. Conference on Intelligence and Security Informatics* (ISI), pp. 233–238, July 10–12, 2011.
502. Xing, Y., Q. Miao, K.-L. Tsui, and M. Pecht, "Prognostics and Health Monitoring for Lithium-ion Battery," *Intl. Conference on Intelligence and Security Informatics* (ISI), pp. 242–247, July 10–12, 2011.
503. Khuu V., M. Osterman, A. Bar-Cohen, and M. Pecht, "Considerations in the Use of the Laser Flash Method for Thermal Measurements of Thermal Interface Materials," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 1, No. 7, pp. 1015–1028, July 2011.
504. Wang, W., and M. Pecht, "Economic Analysis of Canary-based Prognostics and Health Management," *IEEE Transactions on Industrial Electronics*, Vol. 58, No. 7, pp. 3077–3089, July 2011.
505. Alam, M. A., D. Das, M. H. Azarian, B. Sood, and M. Pecht, "Influence of Molding Compound on Leakage Current in MOS Transistors," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 1, No. 7, pp. 1054–1063, July 2011.
506. Cheng, S., D. Das, and M. Pecht, "Using Failure Modes, Mechanisms, and Effects Analysis in Medical Device Adverse Event Investigations," *Int'l Conf. on Biomedical Ontology*, Buffalo, NY, pp. 340–345, July 26–30, 2011.
507. Sood, B., M. Osterman, and M. Pecht, "Tin Whisker Analysis of Toyota's Electronic Throttle Controls," *Circuit World*, Vol. 37, No. 3, pp. 4–9, 2011.
508. Chang, M., D. Das, and M. Pecht, "Junction Temperature Characterization of High Power Light Emitting Diodes," *2011 IMAPS Mid-Atlantic Microelectronics Conf.*, Atlantic City, NJ, June 23–24, 2011.
509. Haddad, G., P. Sandborn, and M. Pecht, "Using Real Options to Manage Condition-based Maintenance Enabled by PHM," *Proc. of 2011 IEEE Int'l Conf. on Prognostics and Health Management*, Denver, CO, June 20–23, 2011.
510. Miao, Q., M. H. Azarian, and M. Pecht, "Cooling Fan Bearing Fault Identification Using Vibration Measurement," *Proc. of 2011 IEEE Int'l Conf. on Prognostics and Health Management*, Denver, CO, June 20–23, 2011.
511. Miao, Q., D. Wang, and M. Pecht, "Rolling Element Bearing Fault Feature Extraction using EMD-based Independent Component Analysis," *Proc. of 2011 IEEE Int'l Conf. on Prognostics and Health Management*, Denver, CO, June 20–23, 2011.
512. He, W., N. Williard, M. Osterman, and M. Pecht, "Remaining Useful Performance Analysis of Batteries," *Proc. of 2011 IEEE Int'l Conf. on Prognostics and Health Management*, Denver, CO, June 20–23, 2011.
513. Sotiris, V., E. Slud, and M. Pecht, "Reliability Inference in a First Hitting Time Model with Augmented Data," *Proc. of Int'l Conf. on Mathematical Methods in Reliability*, Beijing, China, June 20–24, 2011.

514. He, X., M. Azarian, and M. Pecht, "Evaluation of Electrochemical Migration on Printed Circuit Boards with Lead-Free and Tin-Lead Solder," *Journal of Electronic Materials*, Vol. 40, No. 9, pp. 1921–1936, June 2011.
515. Haddad, G., P. Sandborn, and M. Pecht, "Method for Valuating Options Arising in PHM," *Proc. of 2011 IEEE Int'l Conf. on Prognostics and Health Management*, Denver, CO, June 21, 2011.
516. Pecht, M., "Remaining Useful Performance Analysis of Batteries," Proc. of 2011 IEEE Int'l Conf. on Prognostics and Health Management, Denver, CO, June 21, 2011.
517. George, E., D. Das, M. Osterman, and M. Pecht, "Thermal Cycling Reliability of Lead-Free Solders (SAC305 and Sn3.5Ag) for High-Temperature Applications," *IEEE Transactions on Device and Materials Reliability*, Vol. 11, No. 2, pp. 328–338, June 2011.
518. Vasan, A. S. S., R. Doraiswami, and M. Pecht, "Embedded 3D BioMEMS for plexed Label Free Detection," *Proc. of the 61st Electronic Components and Technology Conf.* (ECTC), Orlando, FL, pp. 1412-1419, 2011.
519. Deng F., S. Zhang, R. Kang, and M. Pecht, "Investigation on the Failure Data of Commercial Aircrafts and Computer Motherboard," *Proc. of 9th Int'l Conf. on Reliability, Maintainability and Safety*, Guiyang, China, June 14, 2011.
520. Mathew S., and M. Pecht, "Prognostics of Systems: Approaches and Applications," *24th Int'l Conf. on Condition Monitoring and Diagnostics Engineering Management*, Stavanger, Norway, May 30–June 1, 2011.
521. Azarian, M., R. S. R. Kumar, N. Patil, A. Shrivastava, and M. Pecht, "Applications of Health Monitoring to Wind Turbines," *24th Int'l Congress on Condition Monitoring and Diagnostics Engineering Management*, Stavanger, Norway, pp. 304-313, May 30–June 1, 2011.
522. Sun, J. H. Zuo, and M. Pecht, "Advances in Sequential Monte Carlo Methods for Joint State and Parameter Estimation Applied to Prognostics," *Prognostics and System Health Management Conference*, Shenzhen, China, May 24–25, 2011.
523. Li, Y., M. Pecht, S. Zhang, and R. Kang, "Return on Investment of a LED Lighting System," *Prognostics and System Health Management Conference*, Shenzhen, China, May 24–25, 2011.
524. Chauhan, P., M. Osterman, and M. Pecht, "Thermal Cycling Reliability of Sn96.5Ag3.0Cu0.5 Solder Assembled with ENIG and OSP Pad Finishes," *IMAPS Advanced Technology Workshop on High Reliability Microelectronics for Military Applications*, Linthicum Heights, MD, May 17–19, 2011.
525. Chai, F., M. Osterman, and M. Pecht, "CLCC Solder Joint Life Prediction under Complex Temperature Cycling Loading," *IMAPS Advanced Technology Workshop on High Reliability Microelectronics for Military Applications*, Linthicum Heights, MD, May 17–19, 2011.
526. He, W., N. Williard, M. Osterman, and M. Pecht, "Prognostics of Lithium-ion Batteries using Extended Kalman Filtering," *IMAPS Advanced Technology Workshop on High Reliability Microelectronics for Military Applications*, Linthicum Heights, MD, May 17–19, 2011.
527. Williard, N., W. He, M. Osterman, and M. Pecht, "Predicting Remaining Capacity of Batteries for UAVs and Electric Vehicle Applications," *IMAPS Advanced Technology Workshop on High Reliability Microelectronics for Military Applications*, Linthicum Heights, MD, May 17–19, 2011.
528. Han, S., C. Johnson, M. Osterman, and M. Pecht, "Effectiveness of Conformal Coatings on Surface Mount Components as Tin Whisker Mitigation," *IMAPS Advanced Technology Workshop on High Reliability Microelectronics for Military Applications*, Linthicum Heights, MD, May 17–19, 2011.
529. Oh, H., M. Azarian, and M. Pecht, "Estimation of Fan Bearing Degradation using Acoustic Emission Analysis and Mahalanobis Distance," *IMAPS Advanced Technology Workshop on High Reliability Microelectronics for Military Applications*, Linthicum Heights, MD, May 17–19, 2011.
530. Fritzler, T., M. Azarian, and M. Pecht, "Identification of Cracked MLCCs on Printed Circuit Board Assemblies using Time Domain Reflectometry," *IMAPS Advanced Technology Workshop on High Reliability Microelectronics for Military Applications*, Linthicum Heights, MD, May 17–19, 2011.
531. Han, S., M. Osterman, and M. Pecht, "Likelihood of Metal Vapor Arc by Tin Whiskers," *IMAPS Advanced Technology Workshop on High Reliability Microelectronics for Military Applications*, Linthicum Heights, MD, May 17–19, 2011.
532. Alam, M., M. Azarian, M. Osterman, and M. Pecht, "Early Detection of Avalanche Breakdown in Embedded Capacitors using SPRT," MFP*T: The Applied Systems Health Management Conf.*, Virginia Beach, VA, May 10–12, 2011.
533. Haddad, G., P. Sandborn, and M. Pecht, "A Real Options Optimization Model to Meet Availability Requirements for Offshore Wind Turbines," *MFPT: The Applied Systems Health Management Conf.*, Virginia Beach, VA, May 10–12, 2011.

534. Cheng, S., K. Tom, and M. Pecht, "Prognostics for Polymer Positive Temperature Coefficient Resettable Fuses," *MFPT: The Applied Systems Health Management Conf.*, Virginia Beach, VA, May 10–12, 2011.
535. Dai, J., D. Das, and M. Pecht, "Risks to Telecommunication Equipment under Free Air Cooling Conditions and their Mitigation," *MFPT: the Applied Systems Health Management Conf.*, Virginia Beach, VA, May 10–12, 2011.
536. Mathew, S., W. Wang, M. Osterman, and M. Pecht, "Assessment of Solder-Dipping as a Tin Whisker Mitigation Strategy," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 1, No. 5, pp. 957–963, May 2011.
537. Wang, W., M. Osterman, D. Das, and M. Pecht, "Solder Joint Reliability of SnAgCu Solder Refinished Components Under Temperature Cycling Test," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 1, No. 5, pp. 798–808, May 2011.
538. Alam, M., M. Azarian, M. Osterman, and M. Pecht, "Temperature and Voltage Aging Effects on Electrical Conduction Mechanism in Epoxy-$BaTiO_3$ Composite Dielectric used in Embedded Capacitors," *Microelectronics Reliability*, Vol. 51, No. 5, pp. 946–952, May 2011.
539. Kwon, D., M. Azarian, and M. Pecht, "Nondestructive Sensing of Interconnect Failure Mechanisms Using Time-Domain Reflectometry," *IEEE Sensors Journal*, Vol. 11, No. 5, pp. 1236–1241, May 2011.
540. Dai, J., D. Das, and M. Pecht, "Prognostics-based Health Management for Telecom Equipment under Free Air Cooling," *Eurocon 2011*, Lisbon, Portugal, April 27–29, 2011.
541. Wang, W. and M. Pecht, "Software Reliability Analysis of Laptop Computers," *Proc. of 7th IMA Conf. for Modeling Industrial Maintenance and Reliability*, Cambridge, UK, April 18–20, 2011.
542. Liu, Y., and M. Pecht, "Reduction of Motion Artifacts in Electrocardiogram Monitoring Using an Optical Sensor," *Biomedical Instrumentation & Technology*, Vol. 45, No. 2, pp. 155–163, March/April 2011.
543. Sood, B., and M. Pecht, "Controlling Moisture in Printed Circuit Boards," *IPC APEX 2011*, Las Vegas, NV, April 12–14, 2011.
544. He, X., M. Azarian, and M. Pecht, "Analysis of Electrochemical Migration Kinetics Using Electrochemical Impedance Spectroscopy," *Proc. of IPC Apex Expo Conf.*, Las Vegas, NV, April 12–14, 2011.
545. Alam, M., M. Azarian, M. Osterman, and M. Pecht, "Failure Mechanisms in Embedded Planar Capacitors During High Temperature Operating Life (HTOL) Testing," *IPC APEX 2011*, Las Vegas, NV, April 12–14, 2011.
546. Woo, S., D. O'Neal, and M. Pecht, "Reliability Design of Residential Sized Refrigerators Subjected to Repetitive Random Vibration Loads during Rail Transport," *Engineering Failure Analysis*, Vol. 18, pp. 1322–1332, March 2011.
547. Ma, L., B. Sood, and M. Pecht, "Effect of Moisture on Thermal Properties of Halogen-Free and Halogenated Printed-Circuit-Board Laminates," *IEEE Transactions on Device and Materials Reliability*, Vol. 11, No. 1, pp. 66–75, March 2011.
548. Wen, Z., H. Zuo, and M. Pecht, "Electrostatic Monitoring of Gas Path Debris for Aero-engines," *IEEE Transactions on Reliability*, Vol. 60, No. 1, pp. 33–40, Mar. 2011.
549. Miao, Q., Cong. L., and M. Pecht, "Identification of Multiple Characteristic Components with High Accuracy and Resolution using the Zoom Interpolated Discrete Fourier Transform," *Measurement Science and Technology*, Vol. 22, pp. 1–12, March 2011.
550. Ning, Y., P. Rundle, and M. Pecht, "Prognostics and Health Management's Potential Benefits to Warranty," *7th Annual Warranty Chain Management Conf.*, San Diego, CA, March 15–17, 2011.
551. Menon, S., C. Stecki, J. Song, and M. Pecht, "Optimization of PHM System for Electronic Assemblies Using Maintenance Aware Design Environment Software," *Proc. of 14th Australian Int'l Aerospace Congress*, Melbourne, Australia, Feb. 28–March 3, 2011.
552. Miao, Q., L. Liu, Y. Feng, and M. Pecht, "Complex System Maintainability Verification with Limited Samples," *Microelectronics Reliability*, Vol. 51, No. 2, pp. 294–299, Feb. 2011.
553. Niu, G., S. Singh, S.W. Holland, and M. Pecht, "Health Monitoring of Electronic Products Based on Mahalanobis Distance and Weibull Decision Metrics," *Microelectronics Reliability*, Vol. 51, No. 2, pp. 279–284, Feb. 2011.
554. Wu, C., C. Yang, S. Lo, N. Vichare, E. Rhem, and M. Pecht, "Automatic Data Mining for Telemetry Database of Computer Systems," *Microelectronics Reliability*, Vol. 51, No. 2, pp. 263–269, Feb. 2011.
555. Liu, S., Q. Yu, and M. Pecht, "Reliability Evaluation of Electronic Devices Considering the Actual Use Conditions," *Proc. of InterPACK2011*, Feb. 2011.
556. Ma, L., B. Sood, M. Pecht and S. Bao, "Effect of Moisture on Coefficient of Thermal Expansion of Printed Circuit Board Laminates," *Materials Review*, Vol. 24, No. 11, pp. 6–9, 2010 (in Chinese).
557. Ma, L., S. Bao, B. Sood, and M. Pecht, "Advances in Halogen-free Flame Retardants of Printed Circuit Boards," *Materials Review*, Vol. 24, No. 12, pp. 50–54, 2010 (in Chinese).

558. Tiku, S., and M. Pecht, "Validation of Reliability Capability Evaluation Model Using a Quantitative Assessment Process," *International Journal for Quality and Reliability Management*, Vol. 27, No. 8, pp. 938–952, 2010.
559. Vasan, A. S. S., R. Doraiswami, and M. Pecht, "Biocompatible Polymer Composite Material for Highly Sensitive Point of Care BioMEMS Microcantilever Sensors," *Proc. of the SMTA International*, pp. 279–288, 2010.
560. Dasgupta, A., R. Doraiswami, M. Azarian, M. Osterman, S. Mathew, and M. Pecht, "The Use of Canaries for Adaptive Health Management of Electronic Systems," *ADAPTIVE 2010*, IARIA Conf. Lisbon, Portugal, Nov. 21–26, 2010.
561. Woo, S. W., D. O'Neal, M. Pecht, and H. E. Kim, "Design for Reliability of Refrigerator Components Subject to Repetitive Loads in Use," *Proc. of the ASME 2010 Int'l Mechanical Engineering Congress* (IMECE2010), #37134, Vancouver, BC, Canada, Nov. 12–18, 2010.
562. Williard, N., P. Chauhan, V. Srinivas, M. Osterman, M. Pecht, and R. Farrell, "Thermal Cycling Reliability of Package on Packages Assembled by One-Pass and Two-Pass Techniques," *Proc. of 2010 SMTA Int'l Conf. and Exhibition*, Orlando, FL, Oct. 24–28, 2010.
563. Miao, Q., D. Wang, and M. Pecht, "A Probabilistic Description Scheme for Rotating Machinery Health Evaluation," *Journal of Mechanical Science and Technology*, Vol. 24, No. 12, pp. 2421–2430, Sept. 2010.
564. Cheng, S., K. Tom, and M. Pecht, "Failure Precursors for Polymer Resettable Fuses," *IEEE Transactions on Device and Materials Reliability*, Vol. 10, No. 3, pp. 374–380, Sept. 2010.
565. Pecht, M., "Prognostics and Health Management Applications to Electronic Systems," *Proc. of New Methods of Damage and Failure Analysis of Structural Parts Conf.*, Ostrava, Czech Republic, pp. 103–114, Sept. 6–10, 2010.
566. Chang, M. H., D. Das, S. W. Lee and M. Pecht, "Concerns with Interconnect Reliability Assessment of High Power Light Emitting Diodes (LEDs)," *SMTA China South Technical Conference 2010*, Shenzhen, China, pp. 63–69, Aug. 31–Sept. 2, 2010.
567. Alam, M., M. H. Azarian, M. Osterman, and M. Pecht, "Prognostics of Embedded Planar Capacitors under Temperature and Voltage Aging," *Proc. of the ASME 2010 Conf. on Smart Materials, Adaptive Structures and Intelligent Systems* (SMASIS2010), Philadelphia, PA, Sept. 28–Oct. 1, 2010.
568. Patil, N., S. Menon, D. Das, and M. Pecht, "Evaluation of Robust Covariancec Estimation Techniques for Anomaly Detection of Insulated Gate Bipolar Transistors (IGBTs)," *Proc. of the ASME 2010 Conf. on Smart Materials, Adaptive Structures and Intelligent Systems* (SMASIS2010), Philadelphia, PA, Sept. 28–Oct. 1, 2010.
569. Niu, G., D. Lau, and M. Pecht, "Computer Manufacturing Management Integrating Lean Six Sigma and Prognostic Health Management," *International Journal of Performability Engineering*, Vol. 6, No. 5, pp. 453–466, Sept. 2010.
570. Kumar, S., and M. Pecht, "Modeling Approaches for Prognostics and Health Management of Electronics," *International Journal of Performability Engineering*, Vol. 6, No. 5, pp. 467–476, Sep. 2010.
571. Kwon, D., M. Azarian, and M. Pecht, "Prognostics of Interconnect Degradation using RF Impedance Monitoring and Sequential Probability Ratio Test," *International Journal of Performability Engineering*, Vol. 6, No. 5, pp. 443–452, Sept. 2010.
572. Gu, J., N. Vichare, B. Ayyub, and M. Pecht, "Application of Grey Prediction Model for Failure Prognostics of Electronics," *International Journal of Performability Engineering*, Vol. 6, No. 5, pp. 435–442, Sept. 2010.
573. Kumar, S., T. W. S. Chow, and M. Pecht, "Approach to Fault Identification for Electronic Products Using Mahalanobis Distance," *IEEE Transactions on Instrumentation and Measurement*, Vol. 59, No. 8, pp. 2055–2064, Aug. 2010.
574. Wang, W., M. Osterman, D. Das, and M. Pecht, "Solder Joint Reliability of SnBi Finished TSOPs with Alloy 42 Lead-frame under Temperature Cycling," *Journal of ASTM International*, Vol. 7, No. 8 (JAI102939), pp. 74–88, Aug. 2010.
575. Elerath, J., and M. Pecht, "IEEE 1413: An IEEE Standard for Reliability Predictions," *2010 11th Intl Conference on Electronic Packaging Technology and High Density Packaging* (ICEPT-HDP), Mountain View, CA, Aug. 16–19, 2010.
576. Cheng, S., and M. Pecht, "A Fusion Prognostics Approach for Electronic Products," *Proc. of the ASME 2010 Int'l Design Engineering Technical Conf. & Computers and Information in Engineering Conf.* (IDETC/CIE 2010), Montreal, Canada, Aug. 15–18, 2010.
577. Niu, G., B. S. Yang, and M. Pecht, "Development of an Optimized Condition-based Maintenance System by Data Fusion and Reliability-centered Maintenance," *Reliability Engineering and System Safety*, Vol. 95, No. 7, pp. 786–796, July 2010.
578. Han, S., M. Osterman, and M. Pecht, "Electrical Shorting Propensity of Tin Whiskers", *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 33, No. 3, Jul. 2010.

579. Woo, S., M. Pecht, and D. O'Neal, "Reliability Design and Case Study of a Refrigerator Parts Subjected to Repetitive Loads," *Reliability Engineering Session*, July 6, 2010.
580. Hirohata, K., K. Hisano, M. Mukai, H. Aoki, C. Takubo, T. Kawakami, and M. Pecht, "Coupled Thermal-stress Analysis for FC-BGA Packaging Reliability Design," *IEEE Transactions on Components and Packaging Technologies*, Vol. 33, No. 2, pp. 347–358, June 2010.
581. Sotiris, V., P. W. Tse, and M. Pecht, "Anomaly Detection through a Bayesian Support Vector Machine," *IEEE Transactions on Reliability*, Vol. 59, No. 2, pp. 277–286, June 2010.
582. Huang, Y., R. Doraiwami, M. Osterman, and M. Pecht, "Energy Harvesting Using RF MEMS," *Electronic Components and Technology Conference* (ECTC), 2010 Proceedings 60th, pp. 1353–1358, June 1–4, 2010.
583. Nie, L., M. Osterman, and M. Pecht, "Microstructural Analysis of Reworked Ball Grid Array Assemblies Under Thermomechanical Loading Conditions," *IEEE Transactions on Device and Materials Reliability*, Vol. 10, No. 2, pp. 276–286, June 2010.
584. Cheng, S., M. Azarian, and M. Pecht, "Sensor Systems for Prognostics and Health Management," *Sensors*, Vol. 10, pp. 5774–5797, June 2011.
585. He, X., M. Azarian, and M. Pecht, "A Study of the Effect of Solder Mask on Electrochemical Migration of Printed Circuit Board," *Proc. of IPC Apex Conf*., Las Vegas, April 2010.
586. Alam, M., M. Azarian, M. Osterman, and M. Pecht, "Effect of Environmental Stress and Bias Conditions on Reliability of Embedded Planar Capacitors," *Proc. of IPC Apex Conf*., Las Vegas, April 2010.
587. Gu, J., and M. Pecht, "Prognostics and Health Assessment Implementation for Electronic Products," *Journal of the IEST*, Vol. 53, No. 1, pp. 44–58, April 2010.
588. Pecht, M., "A Prognostics and Health Management Roadmap for Information and Electronics-Rich Systems," *IEICE Fundamentals Review*, Vol. 3, No. 4, pp. 25–32, April, 2010. Michael PECHT, "A Prognostics and Health Management for Information and Electronics-Rich Systems" , エレクトロニクス実装学会誌　Vol. 13, No. 7, pp. 484-492 (2010)
589. Wang, W., D. Banjevic, and M. Pecht, "A Multi-component and Multi-failure Mode Inspection Model based on the Delay Time Concept," *Reliability Engineering and System Safety*, No. 95, pp. 912–920, April 2010.
590. Sood, B., R. Sanapala, D. Das, M. Pecht, C. Y. Huang, and M. Y. Tsai, "Comparison of Printed Circuit Board Property Variations in Response to Simulated Lead-free Soldering," *IEEE Transactions on Electronics Packaging Manufacturin*g, Vol. 33, No. 2, pp. 98–111, April 2010.
591. Pecht, M., and R. Jaai, "A Prognostics and Health Management Roadmap for Information and Electronics-rich System," *Microelectronics Reliability*, Vol. 50, No. 3, pp. 317–323, March 2010.
592. Weininger, S., K. C. Kapur, and M. Pecht, "Exploring Medical Device Reliability and Its Relationship to Safety and Effectiveness," *IEEE Transactions on Components and Packaging Technologies*, Vol. 33, No. 1, pp. 240–245, Mar. 2010.
593. Zhang, S., M. Osterman, A. Shrivastava, R. Kang, and M. Pecht, "The Influence of H2S Exposure on Immersion-Silver-Finished PCBs under Mixed-Flow Gas Testing," *IEEE Transactions on Device and Materials Reliability*, Vol. 10, No. 1, pp. 571–581, March 2010; update of *2009 Int'l Conf. on Electronic Packaging Technology & High Density Packaging* (ICEPT-HDP), Tsinghua University, Beijing, China, pp. 116–122, Aug. 10–13, 2009.
594. Challa, V., L. D. Lopez, M. Osterman, and M. Pecht, "Stress Relaxation Testing of Stamped Metal Land-Grid-Array Sockets," *IEEE Transactions on Device and Materials Reliability*, Vol. 10, No. 1, pp. 55–61, March 2010.
595. Ma, L., B. Sood, and M. Pecht, "Effects of Moisture Content on Dielectric Constant and Dissipation Factor of Printed Circuit Board Materials," *ECS Transactions*, Vol. 27, Iss. 1, pp. 227–236; China Semiconductor Technology Int'l Conf. 2010: Metrology, Reliability and Testing, Shanghai, China, March 18–19, 2010.
596. Fong, B., and M. Pecht, "Prognostics in Wireless Telecare Networks: A Perspective on Serving the Rural Chinese Population," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
597. Sun, B., S. Zeng, R. Kang, and M. Pecht, "Benefits Analysis of Prognostics in Systems," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
598. Niu, G., D. Anand, and M. Pecht, "Prognostics and Health Management for Energetic Materials Systems," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
599. Zhang, S., R. Kang, G. Niu, and M. Pecht, "Status of Research and Development on Prognostics and Health Management in China," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
600. Niu, G., D. Lau, and M. Pecht, "Improving Computer Manufacturing Management Through Lean Six Sigma and PHM," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
601. Wen, Z., H. Zuo, D. K. Lau, and M. Pecht, "Research on Electrostatic Monitoring Technology for Aero-engine Gas Path," *2010 Prognostics & System Health Management Conf.*, Macau, China, pp. 1–5, Jan. 12–14, 2010.

602. Oh, H., M. Azarian, and M. Pecht, H. Clifford, R. Sohaney, and E. Rhem, "Physics-of-Failure Approach for Fan PHM in Electronics Applications," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
603. Niu, G., S. Singh, S. W. Holland, and M. Pecht, "Anomaly Detection of Notebook Computer Based on Weibull Decision Metrics," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
604. Dai, J., D. Das, and M. Pecht, "Prognostics-based Health Management for Free Air Cooling of Data Centers," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
605. Sun, J., H. Zuo, H. Yang, and M. Pecht, "Study of Ensemble Learning-based Fusion Prognostics," *2010 Prognostics & System Health Management Conf.*, Macau, China, Jan. 12–14, 2010.
606. Kumar, S., E. Dolev, and M. Pecht, "Parameter Selection for Health Monitoring of Electronic Products," *Microelectronics Reliability*, Vol. 50, pp. 161–168, 2010.
607. Woo, S. W., D. O'Neal, and M. Pecht, "Failure Analysis and Redesign of the Evaporator Tubing in a Kimchi Refrigerator," *Engineering Failure Analysis*, Vol. 17, pp. 369–379, 2010.
608. Alam, M., M. Azarian, M. Osterman, and M. Pecht, "Effectiveness of Embedded Capacitors in Reducing the Number of Surface Mount Capacitors for Decoupling Applications," *Circuit World*, Vol. 36, No. 1, pp. 22–30, 2010.
609. Woo, S. W., D. O'Neal, and M. Pecht, "Reliability Design of a Reciprocating Compressor Suction Reed Valve in a Common Refrigerator Subjected to Repetitive Pressure Loads," *Engineering Failure Analysis*, Vol. 17, pp. 979–991, 2010.
610. Nie, L., M. Osterman, F. Song, J. Lo, S. W. Lee, and M. Pecht, "Solder Ball Attachment Assessment of Reballed Plastic Ball Grid Array Packages," *IEEE Transactions on Components and Packaging Technology*, Vol. 32, No. 4, pp. 901–908, Dec. 2009.
611. Pecht, M., and L. Zuga, "China as Hegemon of the Global Electronics Industry: How It Got That Way and Why It Won't Change," *Open Forum, IEEE Transactions on Components and Packaging Technology*, Vol. 32, No. 4, pp. 935–939, Dec. 2009.
612. Yang, S., J. Wu, and M. Pecht, "Reliability Assessment of Land Grid Array Sockets Subjected to Mixed Flowing Gas Environment," *IEEE Transactions on Reliability*, Vol. 58, No. 4, pp. 634–640, Dec. 2009.
613. Niu, G., D. Lau, and M. Pecht, "Lifetime Assessment of LED Lighting Based on Prognostics," *IEEE Electrical Design of Advanced Packaging and Systems Symposium*, Hong Kong, Dec. 2–4, 2009.
614. George, E., D. Das, M. Osterman, and M. Pecht, "Physics of Failure Based Virtual Testing of Communication Hardware," *Proc. of ASME Int'l Mechanical Engineering Congress and Expo*, Lake Buena Vista, FL, Nov. 13–19, 2009.
615. Oh, H., T. Shibutani, and M. Pecht, "Precursor Monitoring Approach for Reliability Assessment of Cooling Fans," *Journal of Intelligent Manufacturing*, Vol. 23, No. 2, pp. 173–178, Nov. 2009.
616. Pecht, M., "Characterization of Lead-free Solder Interconnects Reliability Under Torsional Loads," *ASME Conf. IMECE*, Nov. 2009.
617. Gu, J., D. Barker, and M. Pecht, "Health Monitoring and Prognostics of Electronics Subject to Vibration Load Conditions," *IEEE Sensors Journal*, Vol. 9, No. 11, pp. 1479–1485, Nov. 2009.
618. Niu, G., M. Lu, D. Lau, and M. Pecht, "Prognostics-based Qualification for LED Lighting Systems," *4th Int'l Microsystems, Packaging, Assembly and Circuits Technology Conference* (IMPACT 2009), Taipei, Taiwan, Oct. 21–23, 2009.
619. Wu, M. L., and M. Pecht "Semiconductor Component Qualification" *Proceedings of the 4th International Microsystems, Packaging, Assembly and Circuits Technology (IMPACT) Conference*, Taipei, Taiwan, Oct. 19–23, 2009.
620. Sanapala, R., B. Sood, D. Das, and M. Pecht, "Effect of Lead-free Soldering on Key Material Properties of FR-4 Printed Circuit Board Laminates," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 32, No. 4, pp. 272–280, Oct. 2009.
621. Weininger, S., and M. Pecht, "Exploring Medical Device Reliability and Its Relationship to Safety and Effectiveness," *IEEE Symposium on Product Compliance Engineering*, Silver Spring, MD, Oct. 26–28, 2009.
622. Wang, W., A. Choubey, M. Azarian, and M. Pecht, "An Assessment of Immersion Silver Surface Finish for Lead-Free Electronics," *Journal of Electronic Materials*, Vol. 38, No. 6, pp. 815–827, 2009.
623. Zhou, Y., and M. Pecht, "Investigation on Mechanism of Creep Corrosion of Immersion Silver Finished Printed Circuit Board by Clay Tests," *Proc. of 55th Annual IEEE Holm Conf.*, Vancouver, Canada, pp. 321–330, Sept. 14–16, 2009.

624. Sotiris, V., and M. Pecht, "Anomaly Prediction through Latent Variable Gaussian Process Models with SVM Mean Function Priors," *Proc. of Int'l Workshop on Structural Health Monitoring*, Palo Alto, CA, Sept. 9–11, 2009.
625. Gu, J., N. Vichare, E. Tinsley, and M. Pecht, "Computer Usage Monitoring for Design and Reliability Tests," *IEEE Transactions on Components and Packaging Technologies*, Vol. 32, No. 3, pp. 550–556, Sept. 2009.
626. Kumar, S., and M. Pecht, "Baseline Performance of Notebook Computers under Various Environmental and Usage Conditions for Prognostics," *IEEE Transactions on Components and Packaging Technologies*, Vol. 32, No. 3, pp. 667–676, Sept. 2009.
627. Chauhan, P., M. Osterman, S. W. Lee, and M. Pecht, "Critical Review of the Engelmaier Model for Solder Joint Creep Fatigue Reliability," *IEEE Transactions on Components and Packaging Technologies*, Vol. 32, No. 3, pp. 693–700, Sept. 2009.
628. Khuu, V., M. Osterman, A. Bar-Cohen, and M. Pecht, "Effects of Temperature Cycling and Elevated Temperature/Humidity on the Thermal Performance of Thermal Interface Materials," *IEEE Transactions on Device and Materials Reliability*, Vol. 9, No. 3, pp. 379–391, Sept. 2009.
629. Tsai, M. Y., H. Y. Chang, and M. Pecht, "Warpage Analysis of Flip-Chip PBGA Packages Subject to Thermal Loading," *IEEE Transactions on Device and Materials Reliability*, Vol. 9, No. 3, pp. 419–424, Sept. 2009.
630. Oh, H., T. Shibutani, and M. Pecht, "Identification of Failure Precursor Parameters for Cooling Fans," *ASME 2009 Int'l Design Engineering Technical Conference & Computers and Information in Engineering Conf.* (IDETC/CIE 2009), San Diego, CA, Aug. 30–Sept. 2, 2009.
631. He, X., M. Azarian, and M. Pecht, "Comparative Assessment of Electrochemical Migration on PCBs with Lead-Free and Tin-Lead Solders," *SMT Online Magazine*, (http:// www.ems007.com /pages/ zone.cgi?a= 52435&artpg= 2&topic=0) Aug. 18, 2009; also *Proc. of APEX Expo*, Las Vegas, NV, March 31–April 2, 2009.
632. Liu, Y., and M. Pecht, "Overview of China Medical Device Market and Governmental Regulatory Agency," *Materials and Processes for Medical Devices 2009*, Minneapolis, MN, Aug. 10–12, 2009.
633. Cheng, S., L. Thomas, J. Cook, and M. Pecht, "A Radio Frequency Sensor System for Prognostics," *ASME/CIE 2009*, San Diego, CA, Aug. 2009.
634. Sankavaram, C., B. Pattipati, A. Kodali, K. Pattipati, M. Azam, S. Kumar, and M. Pecht, "Model-based and Data-driven Prognosis of Automotive and Electronic Systems," *5th Annual IEEE Conf. on Automation Science and Engineering*, Bangalore, India, pp. 96–101, Aug. 22–25, 2009.
635. Cheng, S., and M. Pecht, "A Fusion Prognostics Method for Remaining Useful Life Prediction of Electronic Products," *5th Annual IEEE Conf. on Automation Science and Engineering*, Bangalore, India, pp. 102–107, Aug. 22-25, 2009.
636. Gu, J., D. Lau, and M. Pecht, "Health Assessment and Prognostics of Electronic Products - An Alternative Method of Product Life Cycle Cost Improvement," *IEEE Proc. of ICRMS, Chengdu*, China, July 21–25, 2009.
637. Zhang, H., R. Kang, and M. Pecht, "Precursor Parameter Identification for Power Supply Prognostics and Health Management," *IEEE Proc. of ICRMS*, Chengdu, China, July 21–25, 2009.
638. Zhou, Y., and M. Pecht, "Reliability Assessment of Immersion Silver Finished Circuit Board Assemblies Using Clay Test," *IEEE Proc. of ICRMS*, Chengdu, China, July 21–25, 2009.
639. Zhang, S., R. Kang, A. Shrivastava, M. Osterman, and M. Pecht, "A Method of Reliability Assessment on Creep Corrosion for Immersion Silver Finished PCBs," *IEEE Proc. of ICRMS, Chengdu*, China, July 21–25, 2009.
640. Niu, G., and M. Pecht, "A Framework of Cost-effective and Accurate Maintenance Combining CBM RCM and Data Fusion," *IEEE Proc. of ICRMS*, Chengdu, China, July 21–25, 2009.
641. Lopez, L., and M. Pecht, "Modeling of IC Socket Contact Resistance for Reliability and Health Monitoring Applications," *IEEE Transactions on Reliability*, Vol. 58, No. 2, pp. 264–270, June 2009.
642. Patil, N., J. Celaya, D. Das, K. Goebel, and M. Pecht, "Precursor Parameter Identification for Insulated Gate Bipolar Transistor (IGBT) Prognostics," *IEEE Transactions on Reliability*, Vol. 58, No. 2, pp. 271–276, June 2009.
643. Qi, H., M. Osterman and M. Pecht, "A Rapid Life-Prediction Approach for PBGA Solder Joints Under Combined Thermal Cycling and Vibration Loading Conditions," *IEEE Transactions on Components and Packaging Technologies*, Vol. 32, No. 2, pp. 283–292, June 2009.
644. Nie, L., J. Cai, M. Pecht, and R. Ciocci, "Environmental Regulations in Lead-free and Halogen-free Electronics," *Electronics & Packaging* (in Chinese), Vol. 9, No. 6, pp. 42–47, June 2009.
645. Kwon, D., M. H. Azarian, and M. Pecht, "Early Detection of Interconnect Degradation by Continuous Monitoring of RF Impedance," *IEEE Transactions on Device and Materials Reliability*, Vol. 9, No. 2, pp. 296–304, June 2009.

646. Pecht, M., "Impact of Rework on Reliability of Plastic Ball Grid Arrays Subjected to Mechanical Bend Test," *Proc. of Int'l Conf. on Soldering & Reliability* (SMTA), Toronto, Canada, May 20–22, 2009.
647. George, E., D. Das, M. Osterman, and M. Pecht, "Reliability of SAC305 and Sn3.5Ag Solders during High Temperature Thermal Cycling," *Proc. of Int'l Conf. on Soldering & Reliability* (SMTA), Toronto, Canada, May 20–22, 2009.
648. Kwon, D., M. H. Azarian, and M. Pecht, "Identification of Interconnect Failure Mechanisms Using RF Impedance Analysis," *Proc. of IEEE Signal Propagation on Interconnects*, Strasbourg, France, May 2009.
649. Pecht, M., and J. Gu, "Physics-of-failure-based Prognostics for Electronic Products," *Transactions of the Institute of Measurement and Control*, Vol. 31, No. 3/4, pp. 309–322, 2009.
650. Niu, G., D. Lau, and M. Pecht, "Prognostics and Health Management for Next Generation LED Lighting Systems," *Int'l J. of Condition Monitoring and Diagnostic Engineering Management*, 2009.
651. Kwon, D., M. Azarian, and M. Pecht, "Detection of Solder Joint Failure Precursors on Tin-Lead and Lead-free Assemblies using RF Impedance Analysis," I*EEE 2009 Electronic Components and Technology Conference*, San Diego, CA, pp. 663–667, May 26, 2009.
652. Shibutani, T., Q. Yu, and M. Pecht, "Tin Whisker Reliability in Microelectronics," *Micromaterials and Nanomaterials,* No. 09, pp. 49–53, 2009.
653. Nie, L., M. Osterman, and M. Pecht, "Copper Pad Dissolution and Microstructure Analysis of Reworked Plastic Grid Array Packages in Lead-free and Mixed Assemblies," *Journal of Surface Mount Technology*, Vol. 22, No. 2, pp. 13–20, 2009.
654. Woo, S. W., D. O'Neal, and M. Pecht, "Improving the Reliability of a Water Dispenser Lever in a Refrigerator Subjected to Repetitive Stresses," *Engineering Failure Analysis*, Vol. 16, pp. 1597–1606, 2009.
655. Woo, S. W., D. O'Neal, and M. Pecht, "Design of a Hinge Kit System in a Kimchi Refrigerator Receiving Repetitive Stresses," *Engineering Failure Analysis*, Vol. 16, pp. 1655–1665, 2009.
656. Gu J., and M. Pecht, "Health Assessment and Prognostics of Electronic Products: an Alternative to Traditional Reliability Prediction Methods," *Electronics Cooling*, Vol. 15, No. 2, pp. 10–17, May 2009.
657. Woo, S. W., M. Pecht, and D. O'Neal, "Reliability Design and Case Study of a Refrigerator Compressor Subjected to Repetitive Loads," Int'l J. of Refrigeration, Vol. 32, No. 3, pp. 478–486, May 2009.
658. Nie, L., M. Osterman, and M. Pecht, "Copper Pad Dissolution and Microstructure Analysis of Reworked Plastic Grid Array Assemblies," S08-01, IPC APEX 2009, Las Vegas, NV , March 31–April 2, 2009.
659. Oh, H., T. Shibutani, and M. Pecht, "Precursor Monitoring Approach for Reliability Assessment of Cooling Fans," Proc. of Int'l Conf. of Electronics Packaging, Kyoto, Japan, April 2009.
660. Lopez, L.D., V. Challa, and M. Pecht, "Assessing the Reliability of Elastomer Sockets in Temperature Environments," IEEE Transactions on Device and Materials Reliability, Vol. 9, No. 1, pp. 80–86, March 2009.
661. Shibutani, T., M. Osterman, and M. Pecht, "Standards for Tin Whisker Test Methods on Lead-Free Components," IEEE Transactions on Components and Packaging Technologies, Vol. 32, No. 1, pp. 216–219, March 2009.
662. Kumar, S., E. Dolev, M. Pompetzki, and M. Pecht, "A Residual Estimation Based Approach for Isolating Faulty Parameters," IEEE Aerospace Conference, Big Sky, MT, March 7–14, 2009.
663. Pecht, M. and J. Gu, "Prognostics-based Product Qualification," IEEE Aerospace Conference, Big Sky, MT, March 7–14, 2009.
664. Woo, S.W., D. Ryu and M. Pecht, "Design Evaluation of a French Refrigerator Drawer System Subjected to Repeated Food Storage Loads," Engineering Failure Analysis, Vol. 16, pp. 2224–2234, March 2009.
665. Mathew, S., M. Osterman, M. Pecht, and F. Dunlevey, "Evaluation of Pure Tin Plated Copper Alloy Substrates for Tin Whiskers," Circuit World, Vol. 35, No. 1, pp. 3–8, 2009.
666. Elerath, J.G., and M. Pecht, "A Highly Accurate Method for Assessing Reliability of Redundant Arrays of Inexpensive Disks (RAID)," IEEE Transactions on Computers, Vol. 58, No. 3, pp. 289–299, March 2009.
667. Nie, L., M. Osterman, M. Pecht, F. Song, J. Lo, and S.W. Lee, "Solder Ball Attachment Assessment of Reballed Plastic Ball Grid Array Packages," Equipment for Electronic Products Manufacturing (in Chinese), pp. 1–5, Feb. 2009.
668. Qi, H., M. Osterman, and M. Pecht, "Design of Experiments for Board-Level Solder Joint Reliability of PBGA Package under Various Manufacturing and Multiple Environmental Loading Conditions," IEEE Transactions on Electronics Packaging Manufacturing, Vol. 32, No. 1, pp. 32–40, Jan. 2009.
669. Alam, M., M. Azarian, M. Osterman, and M. Pecht, "Reliability of Embedded Planar Capacitors under Temperature and Voltage Stress," Capacitor and Resistor Symposium, Jacksonville, FL, 2009.

670. Kumar, S., V. Sotiris, and M. Pecht, "Health Assessment of Electronic Products using Mahalanobis Distance and Projection Pursuit Analysis," Int'l Journal of Computer, Information, and Systems Sciences, and Engineering, Vol. 2, No.4, pp. 242–250, Fall 2008.
671. Shibutani, T., Q. Yu, M. Shiratori, and M. Pecht, "Pressure-induced Tin Whisker Formation," Microelectronics Reliability, Vol. 48, pp. 1033–1039, 2008.
672. Woo, S.W., D. O'Neal, and M. Pecht, "Improving the Reliability of a Water Dispenser Lever in a Refrigerator Subjected to Repetitive Stresses," *Engineering Failure Analysis*, Vol. 15, No. 8, Nov. 2008.
673. R. Sanapala, B. Sood, D. Das, M. Pecht, C. Y. Huang, and M. Y. Tsai, "Effect of Lead-free Soldering on Key Material Properties of FR-4 Printed Circuit Board Laminates," *Int'l Microsystems, Packaging, Assembly and Circuits Technology Conf.* (EMAP), Taipei, Taiwan, Oct. 24, 2008.
674. Lopez, L., and M. Pecht, "Maxima-SPRT Methodology for Health Monitoring of Contact Resistance in IC Sockets," *1st Int'l. Conf. on Prognostics and Health Management*, Denver, CO, Oct. 6–9, 2008.
675. Michael, A. T., S. Kumar, S. Mathew, and M. Pecht, "Anomaly Detection in Electronic Products," *2nd Electronics System-Integration Technology Conference*, London, UK, Sept. 1–4, 2008.
676. Matkowski, P., K. Urbański, T. Fałat, J. Felba, Z. Żaluk, R. Zwierta, A. Dasgupta, and M. Pecht, "Application of FPGA Units in Combined Temperature Cycle and Vibration Reliability Tests of Lead-free Interconnections," *2nd Electronics System Integration Technology Conference*, London-Greenwich, UK, pp. 1375–1379, 2008.
677. Lantz, L., M. Pecht, and M. Wood, "The Measurement of Ion Diffusion in Epoxy Molding Compounds by Dynamic Secondary Ion Mass Spectroscopy," *IEEE Transactions on Components and Packaging Technologies*, Vol. 31, No. 3, pp. 527–535, Sept. 2008.
678. Han, S., K. Kim, C. Yu, M. Osterman, and M. Pecht, "Observations of the Spontaneous Growth of Tin Whiskers in Various Reliability Conditions," *Proc. of 58th Electronic Components and Technology Conf. 2008*, Orlando, FL, pp. 1484–1490, 2008.
679. Singh, R., and M. Pecht, "Commercial Impact of Silicon Carbide- Opportunities and Challenges in Realizing the Full Potential of SiC Power Devices," *IEEE Industrial Electronics Magazine*, pp. 19–31, Sept. 2008.
680. Lopez, L. and M. Pecht, "Assessing the Operating Temperature and Relative Humidity Environment of IC Sockets in Enterprise Servers," *1st Int'l. Conf. on Prognostics and Health Management*, Denver, CO, Oct. 6–9, 2008.
681. Yang, D., Y. C. Chan, B. Y. Wu, and M. Pecht, "Electromigration and Thermomigration Behavior of Flip Chip Solder Joints in High Current Density Packages," *Journal of Materials Research*, Vol. 23, No. 9, pp. 2333–2339, Sept. 2008.
682. Pecht, M., "Solder Ball Attachment Assessment of Reballed Plastic Ball Grid Array Packages," *IPC Midwest Expo*, Schaumberg, IL, Sept. 24, 2008.
683. Woo, S., and M. Pecht, "Failure Analysis and Redesign of a Helix Upper Dispenser," *Engineering Failure Analysis*, Vol. 15, No. 6, pp. 642–653, Sept. 2008.
684. Choubey, A., H. Yu, M. Osterman, M. Pecht, F. Yun, L. Yonghong, and X. Ming, "Intermetallics Characterization of Lead-free Solder Joints under Isothermal Aging," *Journal of Electronic Materials*, Vol. 37, No. 8, pp. 1130–1138, Aug. 2008.
685. Patil, N., D. Das, K. Goebel, and M. Pecht, "Failure Precursors for Insulated Gate Bipolar Transistors (IGBTs)," *Proc. of the 9th Int'l. Seminar on Power Semiconductors*, Prague, August 26–29, 2008.
686. Qi, H., M. Osterman, and M. Pecht, "Modeling of Combined Temperature Cycling and Vibration Loading on PBGA Solder Joints Using an Incremental Damage Superposition Approach," *IEEE Transactions on Advanced Packaging*, Vol. 31, No. 3, pp. 463–472, August 2008.
687. Wang, W., M. Azarian, and M. Pecht, "Qualification for Product Development," *Proc. of Int'l Conf. on Electronic Packaging Technology & High Density Packaging*, Shanghai, China, pp. 1–12, July 2008.
688. Zhang, S., R. Kang, X. He, and M. Pecht, "China's Efforts in Prognostics and Health Management," *Open Forum, IEEE Transactions on Components and Packaging Technologies*, Vol. 31, No. 2, pp. 509–518, June 2008.
689. Qi, H., N. Vichare, M. Azarian, and M. Pecht, "Analysis of Solder Joint Failure Criteria and Measurement Techniques in the Qualification of Electronic Products," *IEEE Transactions on Components and Packaging Technologies*, Vol. 31, No. 2, pp. 469–477, June 2008.
690. Qi, H., Q. Zhang, E. Tinsley, M. Osterman, and M. Pecht, "High Cycle Cyclic Torsion Fatigue of PBGA Pb-Free Solder Joints," *IEEE Transactions on Components and Packaging Technologies*, Vol. 31, No. 2, pp. 309–314, June 2008.

691. Zhan, S., M. Azarian, and M. Pecht, "Reliability of Printed Circuit Boards Processed Using No-clean Flux Technology in Temperature-Humidity-Bias Conditions," *IEEE Transactions on Device and Materials Reliability*, Vol. 8, No. 2, pp. 426–434, June 2008.
692. Pecht, M., "Health Monitoring, Diagnostics and Prognostics of Electronic Products," *Proc. of the 2008 Int'l Conference on Electronics Packaging*, Tokyo, Japan, pp. 203–208, June 11, 2008.
693. Kumar, S., M. Torres, Y. Chan, and M. Pecht, "A Hybrid Prognostics Methodology for Electronic Products," *Proc. of IEEE WCCI, Hong Kong*, June 1, 2008; also *Int'l. Joint Conf. on Neural Networks* (IJCNN), 2008.
694. Cheng, S., M. Torres, L. Thomas, and M. Pecht, "Autonomous Prognostic Monitoring Device," *Proc. of the 62nd Meeting of the Society for Machinery Failure Prevention Technology*, Virginia Beach, VA, pp. 505–516, May 2008.
695. Kwon, D., M. Azarian, and M. Pecht, "Effect of Solder Joint Degradation on RF Impedance," *Proc. of 12th IEEE Workshop on Signal Propagation on Interconnect*, Avignon, France, pp. 1–4, 2008.
696. Kwon, D., M. Azarian, and M. Pecht, "Detection of Solder Joint Degradation Using RF Impedance Analysis," *Proc. of IEEE Electronic Components and Technology Conference*, Lake Buena Vista, FL, pp. 606–610, May 29, 2008.
697. Qi, H., S. Ganesan, and M. Pecht, "No-Fault-Found and Intermittent Failures in Electronic Products," *Microelectronics Reliability*, Vol. 48, No. 5, pp. 663–674, May 2008.
698. Gu, J., Barker D., and M. Pecht, "Prognostics of Electronics under Vibration Using Acceleration Sensors," *Proc. for 62nd Meeting of the Society for Machinery Failure Prevention Technology* (MFPT), Virginia Beach, VA, pp. 253–263, May 2008.
699. Zhou, Y., and M. Pecht, "Electronics," *Industry Overview, China Economic Review's China Business Guide 2008*, pp. 168–172, 2008.
700. Pecht, M., "Semiconductors," *Industry Overview, China Economic Review's China Business Guide 2008*, pp. 224–228, 2008.
701. Keimasi, M., M. Azarian, and M. Pecht, "Flex Cracking of Multilayer Ceramic Capacitors Assembled with Pb-Free and Tin-Lead Solders," *IEEE Transactions on Device and Materials Reliability*, Vol. 8, No. 1, pp. 182–192, March 2008.
702. Kumar, S., V. Sotiris, and M. Pecht, "Mahalanobis Distance and Projection Pursuit Analysis for Health Assessment of Electronic Systems," *IEEE Aerospace Conference*, Big Sky, Montana, March 2008.
703. Choubey, A., M. Osterman, and M. Pecht, "Microstructure and Intermetallic Formation in SnAgCu BGA Components Attached with SnPb Solder Under Isothermal Aging," *IEEE Transactions on Device and Materials Reliability*, Vol. 8, No. 1, pp. 160–167, March 2008.
704. Wang, W., Y. C. Chen, and M. Pecht, "Anisotropic Conductive Adhesives for Flip-chip Interconnects," *Journal of Adhesion Science & Technology*, Vol. 22, No. 8–9, pp. 871–892, 2008.
705. Kumar, S., and M. Pecht, "Data Analysis Approach for System Reliability, Diagnostics, and Prognostics," *Pan Pacific Microelectronics Symposium*, Hawaii, Jan. 22–24, 2008.
706. Vichare, N., P. Rodgers, V. Eveloy, and M. Pecht, "Environment and Usage Monitoring of Electronic Products for Health Assessment and Product Design," *Quality Technology & Quantitative Management*, Vol. 4, No. 2, pp. 235–250, 2007.
707. Deng Y., M. Pecht, J. Swift, and S. J. Wallace, "Carbon Fiber-Based Grid Array Interconnects," *IEEE Transactions on Components and Packaging Technologies*, Vol. 30, No. 4, pp. 716–723, Dec. 2007.
708. Gu, J., D. Barker and M. Pecht, "Prognostics Implementation of Electronics under Vibration Loading," *Microelectronics Reliability*, Vol. 47, No. 12, pp. 1849–1856, Dec. 2007.
709. Keimasi, M., M. Azarian, and M. Pecht, "Isothermal Aging Effects on Flex Cracking of Multilayer Ceramic Capacitors with Standard and Flexible Terminations," *Microelectronics Reliability*, Vol. 47, No. 12, pp. 2215–2225, Dec. 2007.
710. Kostoff, R. N., M. Briggs, R. L. Rushenberg, C. Bowles, M. Pecht, D. Johnson, S. Bhattacharya, A. Icenhour, K. Nikodym, R. Barth, and S. Dodbele, "Comparison of the Structure and Infrastructure of Chinese and Indian Science and Technology," *Science Direct*, Vol. 74, No. 9, pp. 1609–1630, Nov. 2007.
711. Kostoff, R. N., M. Briggs, R. L. Rushenberg, C. Bowles, A. Icenhour, K. Nikodym, R. Barth, and M. Pecht, "Chinese Science and Technology- Structure and Infrastructure," *Science Direct*, Vol. 74, No. 9, pp. 1539–1573, Nov. 2007.
712. Kostoff, R. N., S. Bhattacharya, and M. Pecht, "Assessment of China's and India's Science and Technology Literature," *Technological Forecasting and Social Change, Science Direct*, Vol. 74, No. 9, pp. 1519–1538, Nov. 2007.

713. Kumar, S., and M. Pecht, "Health Monitoring of Electronic Products Using Symbolic Time Series Analysis," *AAAI Fall Symp. on Artificial Intelligence for Prognostics*, Arlington, VA, pp. 73–80, Nov. 2007.
714. Cheng, S., and M. Pecht, "Multivariate State Estimation Technique for Remaining Useful Life Prediction of Electronic Products," *AAAI Fall Symp. On Artificial Intelligence for Prognostics*, Arlington, VA, pp. 73–80, Nov. 2007.
715. Matkowski, P., K. Urbanski, T. Falat, J. Felba, Z. Zaluk, A. Dasgupta, and M. Pecht, "Combined Temperature Cycle and Vibration Reliability Test of Lead-free Interconnections - Event Detection," *Proc. Int'l Congress on Microreliablity and Nanoreliablity*, Berlin, Germany, Sept. 2007.
716. Gu, J., and M. Pecht, "New Methods to Predict Reliability of Electronics," *Proc. of ICRMS 2007*, Beijing, China, pp. 453–464, August 2007.
717. Elerath, J., and M. Pecht, "Enhanced Reliability Modeling of RAID Storage Systems," *Dependable Storage Networks Symposium* (DSN '07), Edinburgh, Scotland, pp. 175–184, June 25–28, 2007.
718. Mathew, S., M. Osterman, T. Shibutani, Q. Yu, and M. Pecht, "Tin Whiskers; How to Manage and Mitigate the Risks," *Proc. of the Int'l Sym. on High Density Packaging and Microsystems Integration* (HDP '07), Shanghai, China, pp. 1–8, June 2007.
719. Qi, H., M. Osterman, and M. Pecht, "Plastic Ball Grid Array Solder Joint Reliability for Avionics Applications," *IEEE Transactions on Components and Packaging Technologies*, Vol. 30, No. 2, pp. 242–247, June 2007.
720. Tiku, S., M. Azarian, and M. Pecht, "Using a Reliability Capability Maturity Model to Benchmark Electronics Companies," *Int'l. Journal of Quality & Reliability Management*, Vol. 24, No. 5, pp. 547–563, 2007.
721. Qi, H., G. Plaza, S. Ganesan, M. Osterman, and M. Pecht, "Reliability Assessment on Insertion Mount Assembly under Vibration Conditions," *Proc. of 2007 Electronic Components and Technology Conference*, Reno, NV, pp. 407–414, May, 2007.
722. Osterman, M., M. Pecht, and D. Das, "Impact of RoHS Legislations on National Security," *IMAPS Workshop on Military, Aerospace, Space, and Homeland Security: Packaging Issues and Applications* (MASH 2007), Baltimore, MD, May 2007.
723. Tuchband, B., S. Cheng, and M. Pecht, "Technology Assessment of Sensor Systems for Prognostics and Health Monitoring," *IMAPS Workshop on Military, Aerospace, Space, and Homeland Security: Packaging Issues and Applications* (MASH 2007), Baltimore, MD, May 2007.
724. Das, D., K. Chatterjee, M. Pecht, and J. Stradley, "A Case against Buying from Part Brokers," *IMAPS Workshop on Military, Aerospace, Space, and Homeland Security: Packaging Issues and Applications* (MASH 2007), Baltimore, MD, May 2007.
725. Chatterjee, K., D. Das, M. Pecht, and M. Sosnowski, "Counterfeit Detection through Inspection," *IMAPS Workshop on Military, Aerospace, Space, and Homeland Security: Packaging Issues and Applications* (MASH 2007), Baltimore, MD, May 2007.
726. Das, D., M. Pecht, C. Ricci, P. Suorsa, and D. Pinsky, "Demonstration of an Authentication Technique on an International Supply Chain," *IMAPS Workshop on Military, Aerospace, Space, and Homeland Security: Packaging Issues and Applications* (MASH 2007), Baltimore, MD, May 2007.
727. Gu, J., N. Vichare, T. Tracy, and M. Pecht, "Prognostics Implementation Methods for Electronics," *53rd Annual Reliability & Maintainability Symposium* (RAMS), FL, pp. 101–106, Jan. 2007.
728. Nie, L., M. Pecht, and R. Ciocci, "Regulations and Market Trends in Lead-free and Halogen-free Electronics," *Circuit World*, Vol. 33, No. 2, pp. 4–9, 2007.
729. Mathew, S., D. Das, M. Osterman, M. Pecht, J. Clayton, and R. Ferebee, "Virtual Remaining Life Assessment of Electronic Hardware Subjected to Shock and Random Vibration Life Cycle Loads," *Journal of the IEST*, Vol. 50, No. 1, pp. 86–97, April 2007.
730. Sengupta, S., D. Das, S. Ganesan, W. Rollins, D. Pinsky, T. Lin, and M. Pecht, "Assessment of Thermomechanical Damage of Electronic Parts Due to Solder Dipping as a Post-Manufacturing Process," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 30, No. 2, pp. 128–137, April 2007.
731. Tuchband, B., and M. Pecht, "The Use of Prognostics in Military Electronic Systems," *Proc. of the 32nd GOMAC Tech Conference*, Lake Buena Vista, FL, pp. 157–160, March 2007.
732. Fang, T., S. Mathew, M. Osterman, and M. Pecht, "Assessment of Risk Resulting from Unattached Tin Whisker Bridging," *Circuit World*, Vol. 33, No. 1, pp. 5–8, 2007.
733. Yang, S., J. Wu, D. Tsai, and M. Pecht, "Contact Resistance Estimation for Time-Dependent Silicone Elastomer Matrix of Land Grid Array Socket," *IEEE Transactions on Components and Packaging Technologies*, Vol. 30, No. 1, pp. 81–85, March 2007.

734. Eveloy, V., Y. Hwang, and M. Pecht, "The Effect of Electrostatic Discharge on Electrical Overstress Susceptibility in a Gallium Arsenide MESFET-Based Device," *IEEE Transactions on Device and Materials Reliability*, Vol. 7, No. 1, pp. 200–208, March 2007.
735. Zhang, G., C. Kwan, R. Xu, N. Vichare, and M. Pecht, "An Enhanced Prognostic Model for Intermittent Failures in Digital Electronics," *2007 IEEE Aerospace Conference*, pp. 1–8, Big Sky, MT, March 2007.
736. Choubey, A., M. Osterman, M. Pecht, and D. Hillman, "Durability of Repaired and Aged Lead-free Electronic Assemblies," *IPC Printed Circuits Expo, APEX, and Designers Summit*, Los Angeles, CA, Feb. 18–22, 2007.
737. Chatterjee, K., D. Das, M. Pecht, C. Ricci, and P. Suorsa, "Solving the Counterfeit Electronics Problem," *Proc. of the Pan Pacific Microelectronics Symp.*, pp. 294–300, Feb. 1, 2007.
738. Fukuda, Y., M. Osterman, and M. Pecht, "The Impact of Electrical Current, Mechanical Bending, and Thermal Annealing on Tin Whisker Growth," *Microelectronics Reliability*, Vol. 47, No. 1, pp. 88–92, Jan. 2007.
739. Fukuda, Y., M. Osterman, and M. Pecht, "Length Distribution Analysis for Tin Whisker Growth," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 30, No. 1, pp. 36–40, Jan. 2007.
740. Sotiris, V., and M. Pecht, "Support Vector Prognostics Analysis of Electronic Products and Systems," *Association for the Advancement of Artificial Intelligence*, pp. 120–127, 2007.
741. Song, F., S.W. Lee, M. Osterman, and M. Pecht, "Investigation of the Effect of PCB Base Materials and Pad Surface Finish on the Thermal Fatigue Life of Lead-free Solder Joints of PBGA and Passive Resistors," *8th Int'l. Conf. on Electronic Materials and Packaging*, Hong Kong, pp. 106–112, Dec. 11–14, 2006.
742. Mathew, S., M. Osterman, and M. Pecht, "Tin Whisker Bridging Across Electrical Conductors," *Proc. of 2nd Int'l. Eco-electronics Conf.*, Beijing, China, pp. 17–20, Dec. 7–8, 2006.
743. Zhao, P., M. Pecht, S. Kang, and S. Park, "Assessment of Ni/Pd/Au-Pd and Ni/Pd/Au-Ag Preplated Leadframe Packages Subject to Electrochemical Migration and Mixed Flowing Gas Tests," *IEEE Transactions on Components and Packaging Technologies*, Vol. 29, No. 4, pp. 818–826, Dec. 2006.
744. Deng Y., M. Pecht, and K. Rogers, "Analysis of Phosphorus Flame Retardant Induced Leakage Currents in IC Packages Using SQUID Microscopy," *IEEE Transactions on Components and Packaging Technologies*, Vol. 29, No. 4, pp. 804–808, Dec. 2006.
745. Mathew, S., D. Das, M. Osterman, M. Pecht, and R. Ferebee, "Prognostics Assessment of Aluminum Support Structure on a Printed Circuit Board," *Journal of Electronic Packaging*, Vol. 128, pp. 339–345, Dec. 2006.
746. Zhan, S., M. Azarian, and M. Pecht, "Surface Insulation Resistance of Conformally Coated Printed Circuit Boards Processed with No-Clean Flux," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 29, No. 3, pp. 217–223, July 2006.
747. Fukuda Y., M. Osterman, and M. Pecht, "The Effect of Annealing on Tin Whisker Growth", *IEEE Transactions on Electronic Packaging Manufacturing*, Vol. 29, No. 4, pp. 252–258, Oct. 2006.
748. Liu, Y., and M. Pecht, "Reduction of Skin Stretch Induced Motion Artifacts in Electrocardiogram Monitoring Using Adaptive Filtering," *28th International Conference of the IEEE Engineering in Medicine and Biology Society*, New York, Aug 30 to Sept 3, 2006, pp. 6045–6048.
749. Pecht, M., "Establishing a Relationship between Warranty and Reliability," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 29, No. 3, pp. 184–190, July 2006.
750. Rogers, K., and M. Pecht, "A Variant of Conductive Filament Formation Failures in PWBs with 3 and 4 mil Spacings," *Circuit World*, Vol. 32, No. 3, pp. 11–18, 2006.
751. Wu, J., and M. Pecht, "Contact Resistance and Fretting Corrosion of Lead-Free Alloy Coated Electrical Contacts," *IEEE Transactions on Components and Packaging Technologies*, Vol. 29, No. 2, pp. 402–410, June 2006.
752. Huang, Y., D. Bigio, and M. Pecht, "Investigation of the Size and Spatial Distribution of Fillers in Mold Compounds after Device Packaging," *IEEE Transactions on Components and Packaging Technologies*, Vol. 29, No. 2, pp. 364–370, June 2006.
753. Pecht, M., and S. Tiku, "Bogus! Electronic Manufacturing and Consumers Confront a Rising Tide of Counterfeit Electronics," *IEEE Spectrum*, Vol. 45, No. 5, pp. 37–46, May 2006.
754. Eveloy, V., Y. Liu, and M. Pecht, "Developments in Ambulatory Electrocardiography," *Biomedical Instrumentation & Technology*, Vol. 40, No. 3, pp. 238–245, May/June 2006.
755. Fang T., S. Mathew, M. Osterman, and M. Pecht, "Assessing Tin Whisker Risk in Electronic Products", *SMT Magazine, PennWell*, Vol. 20, No. 5, pp. 24–25, May 2006.
756. Vichare, N. M., P. Rodgers, and M. Pecht, "Methods for Binning and Density Estimation of Load Parameters for Prognostics and Health Management," *Int'l. Journal of Performability Engineering*, Vol. 2, No. 2, pp. 149–161, April 2006.

757. Donahoe, D., M. Pecht, I. K. Lloyd, and S. Ganesan, "Moisture Induced Degradation of Multilayer Ceramic Capacitors," *Microelectronics Reliability*, Vol. 46, pp. 400–408, April 2006.
758. Pecht, M., and D. Humphrey, "Uprating of Electronic Parts to Address Obsolescence," *Microelectronics International*, Vol. 23, No. 2, pp. 32–36, 2006.
759. Ciocci, R., and M. Pecht, "Impact of Environmental Regulations on Green Electronics Manufacture," *Microelectronics International*, Vol. 23, No. 2, pp. 45–50, 2006.
760. Choubey A., D. Menschow, S. Ganesan, and M. Pecht, "Effect of Aging on Pull Strength of SnPb, SnAgCu, and Mixed Solder Joints in Peripheral Surface Mount Components," *Journal of SMT*, Vol. 19, No. 2, pp. 33–37, April–June 2006.
761. Fang T., M. Osterman, and M. Pecht, "Statistical Analysis of Tin Whisker Growth," *Microelectronics Reliability*, Vol. 46, No. 5–6, pp. 846–849, May–June, 2006.
762. Vichare, N., and M. Pecht, "Prognostics and Health Management of Electronics," *IEEE Transactions on Components and Packaging Technologies*, Vol. 29, No. 1, pp. 222–229, March 2006.
763. Ganesan S., and M. Pecht, "Open Trace Defects in FR4 Printed Circuit Boards," *Circuit World*, Vol. 32, No. 1, pp. 3–7, 2006.
764. Pecht, M., and Y. Deng, "Electronic Device Encapsulation Using Red Phosphorus Flame Retardants," *Microelectronics Reliability*, Vol. 46, No. 1, pp. 53–62, January, 2006; update of Deng, Y., and M. Pecht, "The Story Behind the Red Phosphorus Mold Compound Device Failures," *Proc. of 2005 Int'l. Sym. on Electronics Materials and Packaging* (EMAP 2005), Tokyo, Japan, pp. 1–5, Dec. 11–14, 2005.
765. Zeng S.-K., M. G. Pecht, and J. Wu, "Status and Perspectives of Prognostics and Health Management Technologies," *Hangkong Xuebao/Acta Aeronautica et Astronautica Sinica*, Vol. 26, No. 5, pp. 626–632, 2005.
766. Eveloy, V., S. Ganesan, Y. Fukuda, J. Wu, and M. Pecht, "Are You Ready for Lead-Free Electronics?" *IEEE Transactions on Components and Packaging Technologies*, Vol. 28, No. 4, pp. 884–894, Sept. 2005.
767. Tiku, S., A. Veneruso, R. Etchells, and M. Pecht, "Risk Factors in Oil and Gas Well Electronics Compared to Other Electronic Industries," *Oil & Gas Science and Technology - Institut Français du Petrole*, Rev. IFP, Vol. 60, No. 4, pp. 721–730, 2005.
768. Eveloy, V., S. Ganesan, Y. Fukuda, J. Wu, and M. Pecht, "WEEE, RoHS, and What You Must Do To Get Ready For Lead-free Electronics," *Proc. of 41st Int'l. Conf. on Microelectronics, Devices and Materials and the Workshop on Green Electronics*, Slovenia, pp. 29–45, Sept. 15, 2005; update of *Proc. of 2005 6th Int'l. Conf. on Electronics Packaging Technology*, Shenzhen, China, pp. 27–44, Aug. 31, 2005.
769. Ganesan, S., G. Kim, J. Wu, M. Pecht, R. Lee, J. Lo, Y. Fu, Y. Li, M. Xu, and J. Felba, "Solder Joint Defects of PBGs after Lead-free Assembly," *15th European Microelectronics and Packaging Conference & Exhibition*, Brugge, pp. 63–68, 2005.
770. Urbanski K., T. Falat, J. Felba, S. Ganesan, and M. Pecht, "A Novel Test Data Acquisition System for Vibration Testing of Printed Circuit Board Assemblies," *15th European Microelectronics and Packaging Conference & Exhibition*, Brugge, pp. 178–183, 2005.
771. Ganesan, S., G. Kim, J. Wu, M. Pecht, and J. Felba, "Lead-free Assembly Defects in Plastic Ball Grid Array Package," *5th Int'l. IEEE Conference on Polymers and Adhesives in Microelectronic and Photonics*, Wroclaw, pp. 219–223, 2005.
772. Qi, H., S. Ganesan, J. Wu, M. Pecht, P. Matkowski, and J. Felba, "Effects of Printed Circuit Board Materials on Lead-free Interconnect Durability," *Proc. of Polytronic 2005*, Wroclaw, Poland, pp. 140–144, October 23–26, 2005.
773. Pecht, M., A. Ramakrishnan, J. Fazio, and C. E. Nash, "The Role of U.S. National Highway Traffic Safety Administration in Automotive Electronics Reliability and Safety Assessment," *IEEE Transactions on Components and Packaging Technologies*, Vol. 28, No. 3, pp. 571–580, Sept. 2005.
774. Liu, Y., V. Eveloy, and M. Pecht, "Non-invasive Electrocardiogram and Blood Pressure Monitors for Cardiovascular Disease," *Proc. of the 38th Int'l Symp. on Microelectronics*, Philadelphia, PA, Sept. 25–29, 2005.
775. Tao, J., and M. Pecht, "Outsourcing to China," *Proc. of IMAPS Nordic Conf.*, Tonsberg, Norway, pp. 2–17, Sept. 11–14, 2005.
776. Huang, Y., S. Zhan, D. Bigio, and M. Pecht, "Distribution of a Minor Solid Constituent in a Transfer Molded e-Pad Leadframe Package," *IEEE Transactions on Components and Packaging Technologies*, Vol. 28, No. 3, pp. 549–554, Sept. 2005.
777. Zhan, S., M. Azarian, and M. Pecht, "Reliability Issues of No-Clean Flux Technology with Lead-free Solder Alloy for High Density Printed Circuit Boards," *Proc. of 38th International Symp. on Microelectronics*, Philadelphia, PA, pp. 367–375, Sept. 25–29, 2005.

778. Zhao, P., and M. Pecht, "Mixed Flowing Gas Studies of Creep Corrosion on Plastic Encapsulated Microcircuit Packages with Noble Metal Pre-Plated Leadframes," *IEEE Transactions on Device and Materials Reliability*, Vol. 5, No. 2, pp. 268–276, June 2005.
779. Eveloy, V., Y. Fukuda, S. Ganesan, J. Wu, and M. Pecht, "Key Concerns in the Assembly of Lead-free Electronics," *Proc. of IMAPS Taiwan 2005 Int'l. Technical Symp.*, Taiwan, pp. 167–183, June 2005.
780. Donahoe, D., and M. Pecht, "New Aging Mechanism in Multilayer Ceramic Capacitators," *Advanced Packaging*, June 2005.
781. Lin, T. Y., M. Pecht, D. Das, J. Pan, and W. Zhu, "The Evaluation of Copper Migration During the Die Attach Curing and Second Wire Bonding Process," *IEEE Transactions on Components and Packaging Technologies*, Vol. 28, No. 2, pp. 337–344, June 2005.
782. Liu, Y., P. E. Campbell, D. Das, and M. Pecht, "Chinese Intellectual Property and Contractual Challenges," *Proc. of 2005 Int'l. Conf. on Electronics Packaging* (ICEP), Tokyo, Japan, pp. 241–246, April 13–15, 2005.
783. Rodgers, P., V. Eveloy, and M. Pecht, "Extending the Limits of Air-Cooling in Microelectronic Equipment," *Proc. of 6th Int'l. Conf. On Thermal, Mechanical and Multiphysics Simulation and Experiments in Micro-Electronics and Micro-Systems, EuroSimE*, pp. 695–702, April 2005.
784. Eveloy, V., Y. Liu, and M. Pecht, "Heart Sound Measurement and Analysis in Cardiovascular Disease Assessment," *Proc. of the SMTA 2005 Medical Electronics Symp.*, Minneapolis, MN, April 25–27, 2005.
785. Ganesan S., J. Wu, M. Pecht, R. Lee, J. Lo, Y. Fu, Y. Li, and M. Xu, "Assessment of Long-term Reliability in Lead-free Assemblies," *2005 Int'l. Conf. on Asian Green Electronics*, Pudong, Shanghai, China, pp. 140–155, March 17, 2005; update of S. Ganesan, J. Wu, M. Pecht, et al., "Long-term Reliability Assessment of Lead-free Soldered Electronics," *IPC and HKPCA 2004 Int'l. Printed Circuit & Electronics Assembly Fair*, Dongguan, China, Dec. 8–10, 2004; update of S. Ganesan, J. Wu, M. Pecht, et al., "Long-term Reliability Assessment of Lead-free Soldered Electronics," *IPC, CEPEA and CEAC 2004 Int'l. Conf. on Lead Free Electronics*, Shanghai, China, Nov. 2004.
786. Lin, T. Y., D. Das, M. Pecht, K. C. Teo, W. H. Zhu, X. Dong, and D. Guanghong, "The Impact of SMD Post Baking Process on the Yield of Printed Circuit Board Assemblies," *Proc. of 6th 2004 Electronics Packaging Technology Conf.*, pp. 224–230, 2004.
787. Vichare, N., P. Rodgers, V. Eveloy, and M. Pecht, "In Situ Temperature Measurement of a Notebook Computer - A Case Study in Health and Usage Monitoring of Electronics," *IEEE Transactions on Devices and Materials Reliability*, Vol. 4, No. 4, pp. 658–663, Dec. 2004.
788. Eveloy, V., P. Rodgers and M. Pecht, "Reliability of Pressure-Sensitive Adhesive Tapes for Heat Sink Attachment in Air-Cooled Electronic Assemblies," IEEE Transactions on Devices and Materials Reliability, Vol. 4, No. 4, pp. 650–657, Dec. 2004.
789. Pecht, M., Y. Fukuda, and S. Rajagopal, "The Impact of Lead-free Legislation Exemptions on the Electronics Industry," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 27, No. 4, pp. 221–232, Oct. 2004.
790. Murray S., C. Hillman, and M. Pecht, "Environmental Aging and De-adhesion of Polyimide Dielectric Films," *Journal of Electronic Packaging*, Vol. 126, pp. 390–397, Sept. 2004.
791. Vichare, N., P. Rodgers, M. Azarian, and M. Pecht, "Application of Health Monitoring to Product Take-back," *Proc. of Electronics Goes Green (EGG) Conf.*, Berlin, Germany, pp. 945–951, Sept. 6–8, 2004.
792. Stellrecht, E., B. Han, and M. Pecht, "Characterization of Hygroscopic Swelling Behavior of Mold Compounds and Plastic Packages," *IEEE Transactions on Components and Packaging Technologies*, Vol. 27, No. 3, pp. 499–506, Sept. 2004.
793. Huang, Y., D. Bigio, and M. Pecht, "Fill Pattern and Particle Distribution of Underfill Material," *IEEE Transactions on Components and Packaging Technologies*, Vol. 27, No. 3, pp. 493–498, Sept. 2004.
794. Fukuda, Y., T. Fang, M. Pecht, and M. Osterman, "Effect of Heat Treatment on Tin Whisker Growth," *SMTA Int'l. Conf.*, pp. 717–723, Sept. 2004.
795. M. Lee, Y. Hwang, M. Pecht, J. Park, Y. Kim, and W. Liu, "Study of Intermetallic Growth on PWBs Soldered with Sn3.0Ag0.5Cu," *Electronic Components & Technology Conference*, June 2004.
796. Qi, H., and M. Pecht, "PBGA Reliability Under Various Manufacturing and Multiple Environmental Loading Conditions," *Proc. of European Microelectronics and Packaging Symp*., Prague, Czech Republic, pp. 403–412, June 16–18, 2004; extension of Qi, H., M. Pecht, C. Wilkinson, and M. Osterman, "Failure Analysis and Virtual Qualification of PGBA Under Multiple Environmental Loadings," ECTC 2004, *54th Electronic Component and Technology Conf.*, Las Vegas, NV, June 1–4, 2004.

797. Qi, H., S. Ganesan, M. Osterman, and M. Pecht, "Accelerated Testing and Finite Element Analysis of PBGA under Multiple Environmental Loadings," *Proc. of 2004 Int'l. Conf. on the Business of Electronic Product Reliability and Liability*, Shanghai, China, pp. 99–106, April 27–30, 2004.
798. Qi, H., M. Osterman, M. Lee, K. Lee, O. Seyong, and T. Schmidt, "Simulation Model Development for Solder Joint Reliability for High Performance FBGA Assemblies," *IEEE 20th Annual Semiconductor Thermal Measurement and Management*, pp. 300–307, March 9–11, 2004.
799. Bumiller, E., M. Pecht, and C. Hillman, "Electrochemical Migration on HASL Plated FR-4 Printed Circuit Boards," *Journal of Surface Mount Technology*, Vol. 17, No. 2, pp. 37–41, April–June 2004; *Proc. of 2004 SMTA Pan Pacific Microelectronics Symp*., Oahu, HI, pp. 201–205, Feb. 11, 2004.
800. Lee, M., and M. Pecht, "Thermal Assessment of Glass-Metal Composition Plasma Display Panels Using Design of Experiments," *IEEE Trans. on Components and Packaging Technologies*, Vol. 27, No. 1, pp. 210–216, March 2004.
801. Xie, J., M. Sun, M. Pecht, and D. Barbe, "Why Gold Flash Can Be Detrimental to Long-term Reliability," *Journal of Electronic Packaging*, Vol. 126, No. 1, pp. 37–40, March 2004.
802. Ciocci, R., and M. Pecht, "Questions Concerning the Migration to Lead-free Solder," *Circuit World*, Vol. 30, No. 2, pp. 34–40, 2004.
803. Casey P., and M. Pecht, "Assessing Lead-free Intellectual Property," *Circuit World*, Vol. 30, No. 2, pp. 46–51, 2004.
804. Xie, J., and M. Pecht, "Applications of In-situ Health Monitoring and Prognostic Sensors," *Pan Pacific Microelectronics Symp.*, Oahu, HI, pp. 381–386, Feb. 12, 2004.
805. Ramakrishnan, A., and M. Pecht, "Load Characterization During Transportation," *Microelectronics Reliability*, Vol. 44, No. 2, pp. 333–338, Feb. 2004.
806. Tiku, S., and M. Pecht, "Auditing the Reliability Capability of Electronics Manufacturers," *Proc. of the 8th Int'l. Workshop*, Tokyo Institute of Technology, Jan. 15, 2004; update of Tiku, S., and M. Pecht, "Reliability Capability Assessment Methodology," *Proc. of the Int'l. Technical Sym. on Packaging, Assembling and Testing & Exhibition*, 2003 IMAPS Brazil, Campinas, Sao Paulo, Brazil, pp. 101–105, Aug. 6–8, 2003; update of: Tiku, S., and M. Pecht, "Auditing the Reliability Capability of Electronics Manufacturers," *Proc. of IPACK '03*, Maui, HI, IPACK 2003-35359, July 6–11, 2003; update of Tiku, S., and M. Pecht, "Auditing the Reliability Capability of Electronics Manufactures," *Proc. of Int'l. IEEE Conf. on the Business of Electronic Product Reliability and Liability*, Hong Kong, pp. 19–24, Jan. 13–17, 2003.
807. Pecht, M, "Impact of Lead-free Legislation on Electronic Industry," *Proc. of 2004 Int'l. IEEE Conf. on Asian Green Electronics*, Shenzhen, China, Jan. 7, 2004.
808. Pecht, M. "Connector Reliability Using Lead-free Finishes," *Proc. of 2004 Int'l. IEEE Conf. on Asian Green Electronics*, Shenzhen, China, Jan. 7, 2004.
809. Xie, J., and M. Pecht, "Reliability Prediction Modeling of Semiconductor Light Emitting Device," *IEEE Transactions on Device and Materials Reliability*, Vol. 3, No. 4, pp. 218–222, Dec. 2003.
810. Casey, P., S. Ganesan, M. Pecht, and D. K. Anand, "Methods for Predicting the Remaining Life of Electronic Assemblies with Carbon Nanotubes and an Optical Transduction Technique," *Proc. of IMECE '03*, 2003 ASME Int'l. Mechanical Engineering Congress, Washington, DC, pp. 1–9 (EPP), Nov. 15–21, 2003; update of Casey, P., D. K. Anand, and M. Pecht, "Carbon Nanotubes and an Optical Method for Life Consumption Monitoring of Electronic Assemblies," *Proc. of 8th Annual Pan Pacific Microelectronics Symp.*, Maui, HI, pp. 225–234, Feb. 18-20, 2003.
811. Fukuda, Y., P. Casey, and M. Pecht, "Evaluation of Selected Japanese Lead-free Consumer Electronics," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 26, No. 4, pp. 305–312, October 2003.
812. Lee, M., M. Pecht, J. Tyson, and T. Schmidt, "3-D Measurement System for Use in Microelectronics, A Cost-Effective, Fast Method Measures Warpage in Electronic Devices," *Advanced Packaging*, pp. 33–34, Nov. 2003.
813. Donahoe, D. N., and M. Pecht, "Are U.S. Jobs Moving to China?" *IEEE Transactions on Components and Packaging Technologies*, Vol. 26, No. 3, pp. 682–686, Sept. 2003.
814. Murray, S., C. Hillman, and M. Pecht, "Environmental Aging and De-adhesion of Siloxane-Polyimide-Epoxy Adhesive," *IEEE Transactions On Components and Packaging Technologies*, Vol. 26, No. 3, pp. 524–531, Sept. 2003.
815. Fukuda, Y., M. Pecht, K. Fukuda, and S. Fukuda, "Lead-Free Soldering in the Japanese Electronics Industry," *IEEE Transactions on Components and Packaging Technologies*, Vol. 26, No. 3, pp. 616–624, Sept. 2003.
816. Ramakrishnan, A., and M. Pecht, "A Life Consumption Monitoring Methodology for Electronic Systems," *IEEE Transactions on Components and Packaging Technologies*, Vol. 26, No. 3, pp. 625–634, Sept. 2003.

817. Stellrecht, E., Han, B., and M. Pecht, "Measurement of Hygroscopic Swelling in Mold Compounds and Its Effect on PEM Reliability," *ASME Proc. of InterPack '03*, Maui, HI, 2003-35252, July 6–11, 2003 (Best Paper Award, Honorable Mention): Technical expansion of: Han, B., M. Pecht, and E. Stellrecht, "Hygroscopic Swelling of Encapsulated Microcircuits - Part I" *Advanced Packaging*, pp. 31–33, June 2003; and Han, B., M. Pecht, and E. Stellrecht, "Hygroscopic Swelling of Encapsulated Microcircuits - Part II" *Advanced Packaging*, pp. 29–30, July 2003.
818. Zhao, P., and M. Pecht, "Field Failure due to Creep Corrosion on Components with Palladium Pre-Plated Leadframes," *Microelectronics Reliability*, Vol. 43, No. 5, pp. 775–783, May 2003.
819. Donahoe, D., C. Hillman, and M. Pecht, "Failures in Base Metal Electrode (BME) Capacitors," *23rd Capacitor and Resistor Technology Symp.*, Scottsdale, AZ, pp. 129–133, March 31–April 3, 2003.
820. Hillman, C., B. Castillo, and M. Pecht, "Diffusion and Absorption of Corrosive Gases in Electronic Encapsulants," *Microelectronics Reliability*, Vol. 43, pp. 635–643, April 2003.
821. Hwang, Y. C., M. Lee, and M. Pecht, "Failure Analysis of Electrostatic Discharge and Electrical Overstress Failures of GaAs MMIC," *IMAPS Advanced Technology Conf. on 3-D Packaging*, Baltimore, MD, pp. 1–5, March 11–13, 2003.
822. Lantz, L., and M. Pecht, "Ion Transport in Encapsulants Used in Microcircuit Packaging," *IEEE Transactions On Components and Packaging Technologies*, Vol. 26, No. 1, pp. 199–205, March 2003.
823. Ardebili, H., E. H. Wong, and M. Pecht, "Hygroscopic Swelling and Sorption Characteristics of Epoxy Molding Compounds Used in Electronic Packaging," *IEEE Transactions On Components and Packaging Technologies*, Vol. 26, No. 1, pp. 206–214, March 2003.
824. Baylakoglu, I., C. Hillman, and M. Pecht, "Characterization of Some Commercial Thermally Cured Potting Materials," *Proc. of Int'l. IEEE Conf. on the Business of Electronic Product Reliability and Liability*, Hong Kong, pp. 279–287, Jan. 13–17, 2003.
825. Fang, T., M. Osterman, and M. Pecht, "A Tin Whisker Risk Assessment Algorithm", *38th International Symposium on Microelectronics, Reliability I, Issues in Packaging*, pp. 61–65, Phil., PA, Se. 25–29, 2005.
826. Thomas D., K. Ayers, and M. Pecht, "The 'Trouble Not Identified' Phenomenon in Automotive Electronics," *Microelectronics Reliability*, Vol. 42, pp. 641–651, 2002.
827. Lee, M., and M. Pecht, "Thermal Characteristics of Glass-Metal Composition Plasma Display Panels," *IEEE Transactions on Advanced Packaging*, Vol. 25, No. 4, pp. 488–494, 2002.
828. Cunningham, J., R. Valentin, M. Osterman, A. Dasgupta, M. Pecht, and D. Tsogos (USMC), "Virtual Life Assessment of Electronic Hardware Used in the Advanced Amphibious Assault Vehicle (AAAV)," *Winter Simulation Conf.*, San Diego, CA, Dec. 8–11, 2002.
829. Wu J., and M. Pecht, "Fretting Corrosion Studies For Lead-Free Alloy Plated Contacts," *Proc. of the 4th Electronics Packaging Technology Con*f., Singapore, pp. 20-24, Dec. 10–12, 2002.
830. Casey, P., and M. Pecht, "The Technical, Social and Legal Outlook for Lead-Free Solders," *IEEE Int'l. Symp. on Electronic Material and Packaging*, pp. 483–492, Kaohsiung, Taiwan, Dec. 2002.
831. Lee, M., M. Pecht, X. Huang, and R. Lee, "Stress Relaxation in Plastic Molding Compounds," *IEEE Int'l. Symp. on Electronic Material and Packaging*, pp. 1–6, Kaohsiung, Taiwan, Dec. 2002.
832. Casey, P., and M. Pecht, "Challenges for Adopting Pb-Free Interconnects for 'Green' Electronics," *IPC/JEDEC Int'l. Conf. on Lead-Free Electronic Components and Assemblies*, pp. 21–32, Taipei, Taiwan, Dec. 10–12, 2002.
833. Wilkinson, C., M. Pecht, J. Wasson, and L. Condra, "The Avionics Hardware Development Process," *Proc. of the World Aviation Congress*, Phoenix, AZ, Nov 2002.
834. Shetty, V., D. Das, M. Pecht, D. Hiemstra, and S. Martin,"Remaining Life Assessment of Electronics of Space Shuttle Remote Manipulator System," *Proc. of the 22nd Space Simulation Conf.*, Ellicott City, MD, Oct. 21–23, 2002.
835. Pecht, M., D. Das, and A. Ramarkrishnan, "The IEEE Standards on Reliability Program and Reliability Prediction Methods for Electronic Equipment," *Microelectronics Reliability*, Vol. 42, pp. 1259–1266, 2002; also presented at *13th ESREF Conf.*, Rimini, Italy, October 7–11, 2002.
836. Lin, L., J. Xie, O. Ramahi, M. Pecht, and B. Donham, "Airborne Operation of Portable Electronic Devices," *IEEE Antenna's and Propagation Magazine*, Vol. 44, No. 4, pp. 30–39, Aug. 2002.
837. Pecht, M., D. Das, and R. Biagini, "Using Electronic Parts Outside the Manufacturer's Specified Temperature Range," *Proc. of the 3rd Int'l. Conf. on Quality and Reliability: Defining Quality & Reliability in the Digital Era*, Melbourne, Australia, pp. 182–192, Aug. 28–30, 2002.
838. Lantz, L., S. Hwang, and M. Pecht, "Characterization of Plastic Encapsulant Materials as a Baseline for Quality Assessment and Reliability Testing," *Microelectronics Reliability*, Vol. 42, pp. 1163–1170, 2002.

839. Pendse, N., D. Thomas, D. Das, and M. Pecht, "Uprating of a Single Inline Memory Module," *IEEE Transactions on Components and Packaging Technologies*, Vol. 25, No. 2, pp. 266–269, June 2002.
840. Murray S., M. Boru, M. Pecht, and D. Erhart, "Tracking Semiconductor Part Changes Through the Part Supply Chain," *IEEE Transactions on Components and Packaging Technologies*, Vol. 25, No. 2, pp. 230–238, June 2002.
841. Mishra, S., M. Pecht, T. Smith, I. McNee, and R. Harris, "Remaining Life Prediction of Electronic Products Using Life Consumption Monitoring Approach," *Proc. of European Microelectronics Packaging and Interconnection Symp.*, Cracow, Poland, pp. 136–142, June 16–18, 2002.
842. Ciocci, R., J. Wu, and M. Pecht, "Impact of Environmental Regulations on Electronics Manufacture, Use and Disposal," *Proc. of European Microelectronics Packaging and Interconnection Symp*., Cracow, Poland, pp. 73–80, June 16–18, 2002.
843. Mishra, S., Pecht, M. and D. Goodman, "In-situ Sensors for Product Reliability Monitoring," *IEEE/SPIE Proc. of Design, Test, Integration and Packaging of MEMS/MOEMS*, Cannes, France, pp. 10–19, May 2002.
844. Sun, M., M. Pecht and D. Barbe, "Lifetime RC Time Delay of On-Chip Copper Interconnect," *IEEE Transactions on Semiconductor Manufacturing*, Vol. 15, No. 2, pp. 253–259, May 2002.
845. Ardebili, H., C. Hillman, M. Natishan, P. McCluskey, M. Pecht, and D. Peterson,"A Comparison of the Theory and Moisture Diffusion in Plastic Encapsulated Microelectronics with Moisture Sensor Chip and Weight-gain Measurements," *IEEE Transactions on Components and Packaging Technologies*, Vol. 25, No. 1, pp. 132–139, March 2002.
846. Wu, J., M. Pecht, and R. Mroczkowski,"Electrical Characterization of Lead-free Solder Separable Contact Interfaces," *Journal of Surface Mount Technology*, Vol. 15, No. 2, pp. 25–29, June 2002; update of paper delivered at *Pan Pacific Microelectronics Symp*., Maui, HI, pp. 125–130, Feb. 5–7, 2002.
847. Pecht, M., and R. Biagini, "The Business, Product Liability and Technical Issues Associated with Using Electronic Parts Outside the Manufacturer's Specified Temperature Range," *Pan Pacific Microelectronics Symp*., Maui, HI, pp. 391–398, Feb. 5–7, 2002.
848. Condra, L., D. Das, N. Pendse, and M. Pecht, "Junction Temperature Considerations in Evaluating Electronic Parts for Use Outside Manufacturers-Specified Temperature Ranges," *IEEE Transactions on Components and Packaging Technologies*, Vol. 24, No. 4, pp. 721–728, Dec. 2001.
849. Das D., N. Pendse, C. Wilkinson, and M. Pecht, "Parameter Recharacterization: a Method of Thermal Uprating," *IEEE Transactions on Components and Packaging Technologies*, Vol. 24, No. 4, pp. 729–737, Dec. 2001.
850. Ramakrishnan, B., P. Sandborn, and M. Pecht, "Process Capability Indices and Product Reliability," *Microelectronics Reliability*, Vol. 41, No. 12, pp. 2067–2070, Dec. 2001.
851. Lee, C., and M. Pecht, "Capturing the Benefits of Disruptive Innovation in E-Business Supply Chain Management," *2001 Int. Conf. on Supply Chain Management and Information Systems*, Hong Kong, pp. 47–55, Dec. 2001.
852. Pecht, M., "Electronics Reliability Engineering in the 21st Century," *3rd Int'l. Symp. on Electronic Materials and Packaging 2001*, Jeju Island, Korea, pp. 1–7, Nov. 2001; update of "Reliability Engineering in the 21st Century - A Focus on Predicting the Reliability of Electronic Products and Systems," *Proc. of 5th Int'l. Conf. on Reliability, Maintainability and Safety*, Dalian, China, Vol. 1, pp. 1–19, Aug. 28–31, 2001.
853. Syrus, T., M. Pecht, and R. Uppalapati, "Manufacturer Assessment Procedure and Criteria for Parts Selection and Management," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 24, No. 4, pp. 351–358, Oct. 2001.
854. Syrus, T., M. Pecht, and D. Humphrey, "Part Assessment Guidelines and Criteria for Parts Selection and Management," *IEEE Transactions on Electronics Packaging Manufacturing*, Vol. 24, No. 4, pp. 339–350, Oct. 2001.
855. Liu, W., and M. Pecht, "Fundamental Reliability Issues Associated with a Commercial Particle-in-Elastomer Interconnection System," *IEEE Transactions on Components and Packaging Technologies*, Vol. 24, No. 3, pp. 520–525, Sept 2001.
856. Liu, W., and M. Pecht, "IC Component Sockets: An Overview," *Connector Specifier*, pp. 24–26, Aug. 2001.
857. Pecht, M., K. Rogers, and C. Hillman, "Hollow Fibers Can Accelerate Conductive Filament Formation," *ASM Int'l. Practical Failure Analysis*, Vol. 1, No. 4, pp. 57–60, Aug. 2001.
858. Veneruso, A. F., A. G. Kosmala, R. Bhavsar, Bernard, and M. Pecht, "Engineered Reliability for Intelligent Well Systems," *OTC 13031, 2001 Offshore Technology Conf*., Houston, TX, pp. 1–10, May 2001.
859. Liu, W., R. Marten, and M. Pecht, "IC Component Sockets: Applications and Challenges," *Int'l. Journal of Microcircuits and Electronic Packaging*, Vol. 24, No. 1, pp. 61–67, First Quarter, 2001.

860. Xie, J., and M. Pecht, "Palladium-Plated Packages: Creep Corrosion and Its Impact on Reliability," *Advanced Packaging*, pp. 39–42, Feb. 2001.
861. Pecht, M., M. Dube, M. Natishan, and I. Knowles, "An Evaluation of Built-In Test," *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 37, No. 1, pp. 266–272, Jan. 2001.
862. Xie, J., M. Pecht, D. DeDonato, and A. Hassanzadeh, "An Investigation of the Mechanical Behavior of Conductive Elastomer Interconnects," *Microelectronics Reliability*, Vol. 41, No. 2, pp. 281–286, 2001.
863. Huang, Z., P. Sandborn, M. Pecht, and R. Solomon, "Lifecycle Forecasting of ASICs," *Future Circuits Int'l.*, Technology Publishing Ltd., London, UK, No. 7, pp. 101–107, 2001.
864. Solomon, R., P. Sandborn, and M. Pecht, "Electronic Part Life Cycle Concepts and Obsolescence Forecasting," *IEEE Transactions on Components and Packaging Technologies*, Vol. 23, No. 4, pp. 707–717, Dec. 2000.
865. Pecht, M., and A. Ramakrishnan, "Development and Activities of the IEEE Reliability Standards Group," *Journal of the Reliability Engineering Association of Japan*, Vol. 22, No. 8, pp. 699–706, Nov. 2000.
866. Xie, J., M. Pecht, and D. Barbe, "Contact Variation and Shielding Performance of Electromagnetic Shielding Gaskets," *IICIT 33rd Connector and Interconnection Symp*., Orlando, FL, pp. 61–70, Oct. 23–25, 2000.
867. Das D., N. Pendsé, M. Pecht, L. Condra, and C. Wilkinson, "Deciphering the Deluge of Data: Understanding Electronic Part Data Sheets for Parts Selection and Management," *IEEE Circuits & Devices*, Vol. 16, No. 5, pp. 26–34, Sept 2000.
868. Humphrey, D., L. Condra, N. Pendsé, D. Das, C. Wilkinson, and M. Pecht, "An Avionics Guide to Uprating of Electronic Parts," *IEEE Transactions on Components and Packaging Technologies*, Vol. 23, No. 3, pp. 595–599, Sept. 2000.
869. Pecht, M., W. Liu, and D. Hodges, "A Comparison with Taiwan," *Semiconductor Int'l.*, Vol. 23, No. 10, pp. 135–136, Sept. 2000; "Semiconductor Companies in China," *Semiconductor Int'l.*, Vol. 23, No. 10, pp. 148–154, Sept. 2000; "Newer Fabs in China," *Semiconductor Int'l.*, Vol. 23, No. 10, pp. 156–162, Sept. 2000; "Trends in China's Semiconductor Industry," *Semiconductor Int'l.*, Vol. 23, No. 10, pp. 134–144, Sept. 2000; update of Lee, C. S., M. Pecht, and Y. S. Chen, "Chinese Electronics Industry in the Year 2000," *IMAPS Taiwan Technical Symp. 2000*, Taiwan, pp. 1–15, April 26, 2000; update of Lee, C., M. Pecht, X. Zong, J. Jiang, and Y. Wang, "Developments in China's Electronics Industry," *Proc. of the Semicon West*, San Jose, CA, pp. 24–36, July 15, 1999; update of Lee, C., M. Pecht, X. Zong, J. Jiang, and Y. Wang, "Recent Developments in China's Electronic Industry," *Proc. of the Third Int'l. Sym. on Electronic Packaging Technology*, Tsinghua Univ. Press, Beijing, China, pp. 24–36, Aug 17-21, 1998.
870. Martens, R., and M. Pecht, "An Investigation of the Electrical Contact Resistance of Corroded Pore Sites on Gold Plated Surfaces," *IEEE Transactions on Advanced Packaging*, Vol. 23, No. 3, pp. 561–567, Aug. 2000.
871. Katz, A., M. Pecht, and E. Suhir, "New Development in Accelerated Testing of Microelectronics," Proc. of the IMAPS Int'l. Sym. on Microelectronics and Packaging, Tel Aviv, Israel, pp. 31–42, June 15, 2000.
872. Martens, R., and M. Pecht, "Effects and Interactions of Design Parameters for Gold Plated Electric Contacts," *Journal of Material Science: Materials in Electronics*, Vol. 11, pp. 209–218. May 2000.
873. Pecht, M., and D. Das, "The Electronic Part Life Cycle," *IEEE Transactions on Components and Packaging Technologies*, Vol. 23, No. 1, pp. 190–193, Mar. 2000.
874. Xie, J., M. Pecht, S. Das, J. Neubel, and B. Zand, "Corrosion of a Zinc-Coated Steel Enclosure at the Contact Interface of Gasket Joint," *IEEE Transactions on Components, Packaging & Manufacturing Technology*, Vol. 23, No. 1, pp. 136–142, Mar. 2000.
875. Xie, J., C. Hillman, P. Sandborn, M., Pecht, A. Hassanzadeh, and D. DeDonato, "Assessing the Operating Reliability of Land Grid Array Elastomer Sockets," *IEEE Transactions on Components, Packaging & Manufacturing Technology*, Vol. 23, No. 1, pp. 171–176, Mar. 2000; extension of Xie, J., M. Pecht, D. DeDonato, and A. Hassanzadeh, "An Investigation on the Mechanical Behavior of Elastomer Interconnects," *32nd Int'l. Symp. on Electromagnetic Compatibility*, *32nd Int'l. Symp. on Microelectronics*, Chicago, IL, pp. 58–63, Oct. 1999.
876. Pecht, M., D. Das, and L. Yang, "Risk Assessment, Mitigation and Management - The Key Focus of Competitive Electronic Products Development in the 21st Century," *Proc. of the SEMICOM Korea Technical Symp. 2000*, Seoul, Korea, pp. 217–224, Feb. 16, 2000.
877. Xie, J., M. Pecht, D. Barbe, S. Das, J. Neubel, and B. Zand, "Effects of Corrosion on the Transfer Impedance of Zinc Coated Steel Enclosures," *IEEE Transactions on Electromagnetic Compatibility*, Vol. 42, No. 1, pp. 71–76, Feb. 2000; extension of Das, S., J. Neubel, B. Zand, D. Hockanson, J. Xie, and M. Pecht, "The Effect of Corrosion on Shielding Effectiveness of a Zinc-Coated Steel Enclosure," *IEEE Int'l. Symp. on Electromagnetic Compatibility*, Denver, CO, pp. 1041–1046, Aug. 1998.

878. Sun, M., M. Pecht, and R. Martens, "Kinetic Model for Noble Plated Electrical Contact Behavior," *Scripta Materialia*, Vol. 42, pp. 1–8, Jan. 2000.
879. Zhang, K., and M. Pecht, "Effectiveness of Conformal Coatings on a PBGA Subjected to Unbiased High Humidity, High Temperature Test," *Microelectronics Int'l.*, Vol. 17, No. 3, pp. 16–20, 2000.
880. Schwach, C. A., A. Mathur, R. Solomon, P. Sandborn, and M. Pecht, "Equipment Supplier Intervention Techniques," *Future EMS Int'l.*, No. 3, pp. 97–100, 2000.
881. Pendse, N. and M. Pecht, "Electrical Performance Comparison of the Military and Commercial Versions of a TI Octal Buffer," *Future Circuits Int'l.*, Vol. 6, pp. 63–67, Technology Publishing Ltd., London, UK, 2000.
882. Xie, J., M. Pecht, A. Dasgupta, J. Swift, and S. Wallace, "A Statistical Mechanical Model of Electrical Carbon Fiber Contacts," *ASME Journal of Electronic Packaging*, Vol. 121, No. 4, pp. 286–290, Dec. 1999.
883. Zhang, Y., D. Das, A. Katz, M. Pecht, and O. Hallberg, "Trends in Component Reliability and Testing," *Semiconductor Int'l.*, pp. 101–106, Sept. 1999.
884. Condra, L., M. Pecht, and N. Pendse, "Terminology For Use of Electronic Parts Outside Manufacturer-specified Temperature Ranges," *IEEE Transactions on Components and Packaging Technology*, Vol. 22, No. 3, pp. 355–356, Sept. 1999.
885. M. Pecht, "Moisture Sensitivity Characterization of Build-up Ball Grid Array Substrates," *IEEE Transactions on Advanced Packaging*, Vol. 22, pp. 515–523, Aug. 1999.
886. Biagini, R., M. Rowland, M. Jackson, and M. Pecht, "Tipping the Scales in Your Favor When Uprating- How to Avoid the Legal Risks of Part Use Outside the Manufacturer's Specified Temperature Range," *IEEE Circuits and Devices*, Vol. 15, No. 4, pp. 15–23, July 1999.
887. Ranade, Y., M. Pecht, and T. Moore, "New Findings in the Occurrence of False-Healing in Plastic Encapsulated Microcircuits Using Scanning Acoustic Microscopy," *IEEE Transactions on Components and Packaging Technology*, Vol. 22, pp. 266–269, June 1999.
888. Dishongh, T., M. Dube, M. Pecht, and J. Wyler, "Failure Analysis of Liquid Crystal Displays Due to Indium Tin Oxide Breakdown," *ASME Journal of Electronic Packaging*, Vol. 121, No. 2, pp. 126–127, June 1999.
889. Hillman, C., Rogers, K., Dasgupta, A., Pecht, M., Dusek, R. and B. Lorence, "Solder Failure Mechanisms in Single-Sided Insertion Mount Printed Wiring Boards," *Circuit World*, Vol. 25, No. 3, pp. 28–38, April 1999.
890. Rogers, K., P. Van Den Driessche, C. Hillman, and M. Pecht, "Do You Know that Your Laminates May Contain Hollow Fibers," *Printed Circuit Fabrication*, Vol. 22, No. 4, pp. 34–38, April 1999.
891. Rogers, K., C. Hillman, M. Pecht, and S. Nachbor, "Conductive Filament Formation Failure in a Printed Circuit Board," *Circuit World*, Vol. 25, No. 3, pp. 6–8, April 1999.
892. Pecht, M., H. Ardebili, A. Shukla, J. Hagge, and D. Jennings, "Moisture Ingress Into Organic Laminates," *IEEE Transactions on Components and Packaging Technology*, Vol. 22, No. 1, pp. 104–110, March 1999.
893. Sun, M., M. Pecht, M. Natishan, and R. Martens, "Lifetime Resistance Model of Bare Metal Electrical Contacts," *IEEE Transactions on Advanced Packaging*, Vol. 22, No. 1, pp. 60–67, Feb. 1999.
894. Pecht, M., Hillman, C., Rogers, K. and D. Jennings, "Conductive Filament Formation: A Potential Reliability Issue in Laminated Printed Circuit Cards with Hollow Fibers," *IEEE Transactions of Electronics Packaging Manufacturing*, Vol. 22, No. 1, pp. 80-84, Jan. 1999.
895. Jackson, M., Mathur, A., Pecht, M. and R. Kendall, "Part Manufacturer Assessment Process," *Quality and Reliability Engineering Int'l.*, Vol. 15, pp. 457–468, 1999.
896. Jackson, M., P. Sandborn, M. Pecht, C. Hemens-Davis, and P. Audette, "A Risk Informed Methodology for Parts Selection and Management," *Quality and Reliability Engineering Int'l.*, Vol. 15, pp. 261–271, 1999.
897. Kimseng, K., M. Hoit, N. Tiwari, and M. Pecht, "Physics-of-Failure Assessment of a Cruise Control Module," *Microelectronics Reliability*, Vol. 39, pp. 1423–1444, 1999.
898. Sun, M., M. Pecht, and M. Natishan, "A Comparative Assessment of Gold Plating Thickness Required for Stationary Electrical Contacts," *Microelectronics Journal*, Vol. 30, No. 8, pp. 811–817, 1999.
899. Xie, J., M. Pecht, J. Swift, and S. Wallace, "An Investigation of the Contact Behavior of Electric Distributed Filament Contacts," *IEEE Transactions on Components Packaging & Manufacturing Technology A*, Vol. 21, pp. 604–609, Dec. 1998.
900. Pecht, M., "Virtual Product Development," *IEEE Transactions on CPMT, Part A* 21 (4), p. 610, Dec. 1998.
901. Zhang, Y., M. Pecht, and L. Lantz, "A Case Study of IC Storage Failures in Taipei Trains," *Microelectronics Reliability*, Vol. 38, No. 12, pp. 1811–1816, Dec. 1998.
902. Dube, M., T. Dishongh, K. Beatty, and M. Pecht, "In Situ Temperature Measurements of PQFPs during Infrared Reflow," *Circuit World*, Vol. 24, No. 4, pp. 29–32, Aug 1998.

903. McCluskey, P., E. Hakim, J. Fink, A. Fowler, and M. Pecht, "Reliability Assessment of Electronic Components Exposed to Long-Term Non-Operating Conditions," *IEEE Transactions On Components, Packaging, and Manufacturing Technology*, Vol. CPMTA-21, No. 2, pp. 352–359, June 1998.
904. Sinnadurai, N., A. Shukla, and M. Pecht, "A Critique of the Reliability-Analysis Center Failure-Rate-Model for Plastic Encapsulated Microcircuits," *IEEE Transactions on Reliability*, Vol. 47, No. 2, pp. 110–113, June 1998.
905. Williams, R., J. Banner, I. Knowles, M. Dube, M. Natishan, and M. Pecht, "An Investigation of 'Cannot Duplicate' Failures," *Quality and Reliability Intl*, pp. 331–337, May/June, 1998.
906. Pecht, M., "Electronic Packaging: Cross Discipline Is the Only Discipline," *IEEE Transactions on CPMT, Part A* 21 (1), pp. 192–194, March 1998.
907. Pecht, M., Boullie, J., Hakim, E., Jain, A., Jackson, M., Knowles, I., Shroeder, R., Strange, A. and J. Wyler, "Realism of FAA Reliability-Safety Requirements and Alternatives," *IEEE Aerospace and Electronic Systems*, Vol. 13, No. 2, pp. 16-20, Feb. 1998.
908. Pecht, M., Boullie, J., Hakim, E., Jain, A., Jackson, M., Knowles, I., Schroeder, R., Strange, A. and J. Wyler, "The Realism of FAA Reliability-Safety Requirements and Alternatives," *IEEE Aerospace and Electronic Systems Magazine*, Vol. 13, No. 2, pp. 16–20, February 1998.
909. Osterman, M., Dasgupta, A., Pecht, M., and M. Torres, "Cost-Effective Systems Development Through Accelerated Risk Assessment," JPL Advanced Packaging Workshop, Pasadena, CA, Jan 13, 1998.
910. Pecht, M., Bernstein, J., Searls, D. and M. Peckerar, "Korea's Focus on Market Dominance," *Semiconductor Int'l*., pp. 118–122, Jan. 1998.
911. Dasgupta, A., Pecht, M. and B. Mathieu, "Design of Experiment Methods for Computational Parametric Studies in Electronic Packaging," *Finite Elements in Analysis and Design*, Vol. 31, pp. 125–146, 1998.
912. Lantz, L., and M. Pecht, "Characterization of Plastic Encapsulant Materials as a Baseline for Reliability Testing," *Workshop on Mechanical Reliability of Polymeric Materials and Plastic Packages of IC Devices*, Vol. 25, pp. 237–249, 1998.
913. Mahajan, R and M. Pecht, "Reliability Assessment of a Plastic Encapsulated RF Switching Device," *Microelectronics Reliability*, Vol. 38, pp. 1607–1610, 1998.
914. Pecht, M., Rogers, K. and A. Fowler, "Characterization of a Non-Woven Randomly Dispersed Short Fiber Laminate," *Circuit World*, Vol. 24, No. 3, pp. 34–37, 1998.
915. Sharma, P., Upadhyayula, K., Lantz, L. and M. Pecht, "Impact of Preconditioning, Voltage Bias and Temperature on Reliability of Plastic Encapsulated Microcircuits," *Microelectronics Reliability*, Vol. 38, No. 4, pp. 581–584, 1998.
916. Pecht, M., and C. Lee, "Flat Panel Displays - What is Going On In East Asia Outside Japan," *Circuit World*, Vol. 24 No. 1, pp. 20–27, Nov. 1, 1997.
917. M. Pecht, "The Role of Electronics in Singapore's Economy," *SMT Int'l. Asia-Pacific*, Vol. 1, No.1, pp. 18–22, Oct. 1997.
918. Sun, M., Javadpour, S., Martens, R. and M. Pecht, "Kinetic Modeling of Corrosion Film on Unloaded Precious Metal Plated Contacts," *Proc. of 30th Connector & Interconnection Sym*., Anaheim, CA, Sept. 22–24, 1997.
919. Condra, L., Anissipour A., Mayfield, D. and M. Pecht, "Electronic Components Obsolescence," IEEE Transactions on Components and Packaging and Manufacturing Technology-Part A, Vol. 20, No. 3, pp. 367, Sept. 1997.
920. Pecht, M., Shukla, A., Kelkar, N. and J. Pecht, "Criteria for the Assessment of Reliability Models," *IEEE Transactions on Components, Packaging, and Manufacturing Technology B*, Vol. 20, No. 3, pp. 229–234, Aug. 1997.
921. Pecht, M. and A. Govind, "In-Situ Measurements of Surface Mount IC Package Deformations During Reflow Soldering," *IEEE Transactions on Components, Packaging, and Manufacturing Technology*, Vol. 20 pp. 207–212, July 1997.
922. Pecht, M., Fink, J., Hakim, E. and J. Wyler, "An Assessment of the Qualified Manufacturer List (QML)," *IEEE AES System Magazine*, Vol. 12, No. 7, pp. 39–43, July 1997.
923. Hakim, E., Fink, J., Tam, S., McCluskey, P. and M. Pecht, "Plastic-encapsulated Microcircuits (PEMs): Long-term Dormancy Studies," *Circuit World*, Vol. 23, No. 4, pp. 26–29, June 1997.
924. Pecht, M., Ranade, Y. and J. Pecht, "Effect of Delamination on Moisture Accelerated Failures in Plastic Encapsulated Microcircuits," *Circuit World*, Vol. 23, No. 4, pp. 11–15, June 1997.
925. Lee, C. and M. Pecht, "Recent Developments in Taiwan's Electronics Industry," Circuit World, Vol. 23, No. 3, pp. 16-19, 27, April 1997; update of M. Pecht and C.S. Lee, "Prospects for Taiwan's Electronic Components Industry," *Solid State Technology*, pp. 11–14, Nov. 1996.

926. Pecht, M., Tucker, W., and S. Wennberg, "Electronics Production in Malaysia," *Solid State Technology*, pp. 21–24, Feb. 1997.
927. McCluskey, P. and M. Pecht, "Pushing the Limit, The Rise of High Temperature Electronics," *Advanced Packaging*, pp. 36–39, Jan/Feb 1997.
928. Shukla, A., Pecht, M., Jordan, J., Rogers, K. and D. Jennings, "Hollow Fibers in PCB, MCM-L and PBGA Laminates May Induce Reliability Degradation," *Circuit World*, pp. 5–6, 10, Vol. 23 No. 2, Jan. 1997; update of A. Shukla, Dishongh, T., Pecht, M. and D. Jennings, "Hollow Fibers in Woven Laminates," *Printed Circuit Fabrication*, Vol. 20 No. 1, pp. 30–32, Jan. 1997.
929. McCluskey, P., Munamarty, R. and M. Pecht, "Popcorning in PBGA Packages During IR Reflow Soldering," *Microelectronic Int'l.*, No. 42, pp. 20–23, Jan. 1997. Update of "Popcorning in PBGA Packages During IR Reflow Soldering," *Proc. of the 1996 Electronics Packaging Technical Conf.*, McCluskey, P., Munamarty, R. and M. Pecht, Austin, TX, pp. 271–281, Sept. 29–Oct. 1, 1996; Update of "Popcorning in PBGA Packages During IR Reflow Soldering," *Proc. of IAMIS'95*, San Diego, CA, Jan. 27, 1995.
930. McCluskey, P., Pecht, M. and S. Azarm, "Reducing Time-to-Market Using Virtual Qualification," *Proc. of the Institute of Environmental Sciences*, pp. 148–152, 1997.
931. Kelkar, N., Dasgupta, A., Pecht, M., Knowles, I., Hawley, M. and D. Jennings, "Smart Electronic Systems for Condition-based Health Management," Quality and Reliability Engineering Int'l., Vol. 13, No. 1, pp. 3–8, 1997; update of "Condition Monitoring and Diagnostic Engineering Management," *Proc. of COMADEM '96*, Sheffield Academic Press, UK, pp. 591–601, July 1996.
932. M. Pecht, "Decreasing the Time-to-Market Throughout Virtual Risk Assessment and Risk Mitigation," ASME Advances in Electronic Packaging, Vol. 1, pp. 1–6, 1997.
933. Jordan J., Pecht, M. and J. Fink, "How Burn-in Can Reduce Quality and Reliability," *Int'l. Journal of Microcircuits and Electronic Packaging*, Vol. 20, No. 1, pp. 35–40, 1997; update from J. Jordan and M. Pecht, *Proc. of Institute of Environmental Sciences*, pp. 16-19, 1996.
934. McCluskey, P., Pecht, M. and M. Osterman, "Software for Reliability Assessment of Electronic Components, Circuit Cards and Equipment," *Proc. of the Second Int'l. Symp. on Electronic Packaging Technology*, Shanghai, China, pp. 472–483, Dec. 9–12, 1996.
935. M. Pecht, "Plastic Encapsulated Microcircuits," *Engineering*, Vol. 237, No. 8, pp. 22–23, Sept. 1996.
936. Martens, R. and M. Pecht, "The Effects of Wipe on Corroded Nickel Contacts," *42nd IEEE Holm Conf. on Electrical Contacts Joint with the 18th Int'l. Conf. on Electric Contacts*, Chicago, IL, Sept. 19, 1996.
937. Das, D., and M. Pecht, "The Role of Heat Transfer Analysis in Avionics Equipment Development," ASME *Proc. of the 32nd National Heat Transfer Conf.*, Vol. 7, HTD-Vol. 329, pp. 197–209, Aug. 1996.
938. Gannamani, R. and M. Pecht, "An Experimental Study of Popcorning in Plastic Encapsulated Microcircuits," *IEEE Transactions on Components, Packaging and Manufacturing Technologies A*, Vol. 19, No. 2, pp. 194–201, June 1996.
939. Munamarty, R., McCluskey, P., Pecht, M. and L. Yip, "Popcorning in Fully Populated and Perimeter Plastic Ball Grid Array Packages," *Soldering & Surface Mount Technology*, No. 22, pp. 46–50, Feb. 1996.
940. M. Pecht, "Why the Traditional Reliability Prediction Models Do Not Work - Is There an Alternative?" *Electronics Cooling*, Vol. 2, No. 1, pp. 10–12, Jan. 1996.
941. Pecht, M. and P. Lall, "A Life-cycle Approach to Design and Manufacturing Simulation of Multichip Modules," *Int'l. Journal of Modeling and Simulation*, Vol. 16, No. 4, pp. 173–183, 1996.
942. M. Pecht, "Issues Affecting Early Affordable Access to Leading Electronics Technologies by the US Military and Government," *Circuit World*, Vol. 22, No. 2, pp. 7–15, 1996.
943. Kelkar, N., Fowler, A., Pecht, M. and M. Cooper, "Phenomenological Reliability Modeling of Plastic Encapsulated Microcircuits," *The Int'l. Journal of Microcircuits and Electronic Packaging*, Vol. 9, No. 1, pp. 3–13, First Quarter 1996.
944. Pecht, M. and A. Dasgupta, "Physics-of-Failure: an Approach to Reliable Product Development," *1995 Int'l. Integrated Reliability Workshop Final Report*, Lake Tahoe, CA, pp. 1–4, Oct. 22–25, 1995.
945. Pecht, M. and A. Dasgupta, "Physics-of-Failure: An Approach to Reliable Product Development," *Journal of the Institute of Environmental Sciences*, pp. 30–34, Sept./Oct. 1995; update of M. Pecht, "Physics-of-failure: An Approach to Reliable Product Development," *Proc. of Institute of Environmental Sciences*, Chicago, IL, pp. 111-117, Aug. 1995; update of "Physics-of-Failure Approach to Design and Reliability Assessment of Microelectronic Packages," *Proc. of the First Int'l. Sym. on Microelectronic Package and PCB Technology*, Beijing, China, pp. 175-180, Sept. 19–23, 1994.

946. Pecht, M. and M. Li, "Environmental Scanning Electron Microscopic Investigation of Failure Mechanisms in Electronic Packages," *Journal of Electronic Packaging Transactions of ASME*, Vol. 117, No. 3, pp. 225–229, Sept. 1995; update of "Environmental Scanning Electron Microscopic Investigation on Interfacial Debonding in Electronic Packages," *Proc. of the ASME Int'l. Electronics Packaging Conf*., Binghamton, NY, Sept. 29–Oct. 2, 1993; update of Li, M. and M. Pecht, "Environmental Scanning Electron Microscopic Investigation on Interfacial Defects in Electronic Packages," *Proc. of the 6th Int'l. Sym. on Nondestructive Characterization of Materials*, Oahu, HI, June 1993.
947. Pecht, M. and P. Lall, "Does the Cooling of Electronics Increase Reliability?" *Communications in RMS*, Vol. 2, No. 2, pp. 24–30, July 1995.
948. Ogunjimi, A., MacGregor, S., Pecht, M. and J. Evans, "The Effect of Manufacturing and Design Process Variabilities on the Fatigue Life of the High Density Interconnect Vias," *Journal of Electronics Manufacturing*, Vol. 5, No. 2, pp. 111–119, June 1995.
949. Wu, S. X., C.-P. Yeh, Wyatt, K., and M. Pecht, "Craze and Instability of Polyimide Thin Films and Its Effects on High Density Interconnects," *IEEE 1995 Proc.. 45th Electronic Components and Technology Conf*., Las Vegas, NV, p. 1293, 922-4. May 21–24, 1995.
950. Stadterman, T., Cushing, M., Hum, B., Malhotra, A. and M. Pecht, "The Transition from Statistical-Field Failure Based Models to Physics-of-Failure Based Models for Reliability Assessment of Electronic Packages," *Proc. of the INTERpack'95*, Lahaina, Maui, HI, pp. 619–625, March 26–30, 1995.
951. Rudra, B., Li, M., Pecht, M. and D. Jennings, "Electrochemical Migration in Multichip Modules," *Circuit World*, Vol. 22, No. 1, pp. 67-70, 1995; update of Li, M., Pecht, M. and L. Wang, "The Physics of Conductive Filament Formation in MCM-L Substrates," *Proc. of the INTERpack'95*, Lahaina, Maui, HI, pp. 517–527, March 26–30, 1995.
952. Prabhu, A., Barker, D., Pecht, M., Evans, J., Grieg, W., Bernard, E. and E. Smith, "A Thermo-Mechanical Fatigue Analysis of High Density Interconnect Vias," *Proc. of the INTERpack'95*, Lahaina, Maui, HI, pp. 187–216, March 26–30, 1995.
953. Lall, P., Pecht, M. and E. Hakim, "Characterization of Functional Relationship Between Temperature and Microelectronic Reliability," *Microelectronics and Reliability*, Elsevier Science Ltd., Vol. 35, No. 3, pp. 377–402, March 1995; update of "The Influence of Temperature on Integrated Circuit Failure Mechanisms," *Quality and Reliability Int'l.*, Vol. 8, pp. 167–175, Aug. 1992; "Modeling the Influence of Absolute Temperature on Microelectronic Device Reliability," M. Pecht, P. Lall, *Internepcon/Semiconductor Thailand '91*, Bangkok, Thailand. Dec. 2–4, 1991; "Microelectronic Reliability/Temperature Independence, Part I," Hakim, E., Pecht, M. and P. Lall, *5th Int'l. Conf. Quality in Electronic Components*, pp. 49-54, Bordeaux-France, Oct. 7–10, 1991; "The Influence of Temperature on Integrated Circuit Failure Mechanisms; Part II," Pecht, M., Lall, P. and E. Hakim, *5th Int'l. Conf. Quality in Electronic Components*, pp. 85–92, Bordeaux-France, Oct. 7–10, 1991; "The Influences of Temperature on Microelectronic Failure Mechanisms," Pecht, M., and P. Lall, *1991 Advanced Microelectronics Technology Qualification, Reliability, and Logistics Workshop*, Seattle, WA, Aug. 13–15, 1991; also Pecht, M., Lall, P. and S. Whelan, "Temperature Dependencies of Microelectronic Devices," *Quality and Reliability Engineering Int'l*., Vol. 6, No. 4, pp. 275–284, Oct. 1990; update of *Proc. 1990 Advanced Microelectronic Technology, Quality, Reliability and Logistics Workshop*, pp. 135–148, San Diego, CA, Aug. 28-30, 1990.
954. Pecht, M., Wu, X., Paik, K., and S. Bhandarkar, "To Cut or Not to Cut: A Thermomechanical Stress Analysis of Polyamide Thin-film on Ceramic Structures," *IEEE Transactions on Components, Packaging and Manufacturing Technology B*, Vol. CPMTB-18, pp. 150–153, Feb. 1995.
955. Kelly, M., Kukowski, J., Boulton, W., Meieran, E., Pecht, M., Pepples, J. and R. Tummala, "JTEC Panel Report on Electronic Manufacturing and Packaging in Japan," *Int'l. Technology Research Institute*, Baltimore, MD, Feb. 1995 (ISBN 1-883712-37-8); update of "JTEC Panel Report on Electronic Manufacturing and Packaging in Japan," *6th Int'l. Electronics Manufacturing Technology Symp*., La Jolla, CA, pp. 96-102, Sept. 12–14, 1994.
956. Pusarla, C., Dasgupta, A., Pecht, M. and A. Christou, "A Physics-of-failure Design Philosophy Applied to Flip-chip Bonds," *Microelectronics Int'l*., No. 36, pp. 6–12, Jan. 1995.
957. Mowrer, F. and M. Pecht, "Exploratory Research on Nonthermal Damage to Electronics from Fires and Fire-Suppression Agents," *Proc. 1995 Annual Reliability and Maintainability Symp*., pp. 1–6, Jan. 1995.
958. Pecht, M., Nash, F. and J. Lory, "Understanding and Solving the Real Reliability Assurance Problems," *Proc. 1995 Annual Reliability and Maintainability Symp.*, pp. 159–161, Jan.1995.
959. Harris, D.B. and M. Pecht, "A Reliability Study of Fuzz Button Interconnects," *Circuit World*, Vol. 21, No. 2, pp. 12–18, 1995.

960. Li, M., Xin, W., Pecht, M., Kyung, P. and E. Bernard, "Relative Humidity Cycle Testing on GE-HDI," *Int'l. Journal of Microelectronic Packaging, Materials and Technologies*, Vol. 1, No. 1, pp. 13–34, 1995.
961. Lall, P., Pecht, M. and D. Barker, "Development of An Alternative Wire Bond Test Technique," *IEEE Transactions on Components, Packaging, and Manufacturing Technology A*, Vol. CPMTA-17, pp. 610-615, Dec. 1994; update of Proc. ASME Winter Annual Meeting, Chicago, IL, Nov. 94; update of *Proc. 1994 Institute of Environmental Services Annual Technical Meeting*, Vol. 2, pp. 22–27, May 1994; update of *13th IEEE Int'l. Electronics Manufacturing Technology Symp.*, pp. 283–287, 1992.
962. M. Pecht, "Success Factors in the Malaysian, Taiwanese and Japanese Electronics Industry," *Eye on Asia*, Nov. 1994.
963. Pecht, M. and X. Wu, "Characterization of Polyimides Used in High Density Interconnects," *IEEE Transactions on Components, Packaging and Manufacturing Technology B*, Vol. CPMTB-17, pp. 632–639, Nov. 1994; update of *7th Int'l. SAMPE Electronics Conf.*, pp. 432–445, June 20–23, 1994.
964. Lall, P., Pecht, M. and M. Cushing, "A Physics-of-Failure Approach to Addressing Device Reliability in Accelerated Testing," *5th European Symp. on Reliability of Electron Devices Failure Physics and Analysis*, Glasgow, Scotland, Oct. 4–7, 1994.
965. Hakim, E., Agarwal, R. and M. Pecht, "The Demise of Plastic Encapsulated Microcircuit Myths," *5th European Sym. on Reliability of Electron Devices, Failure Physics and Analysis*, Glasgow, Scotland, Oct. 6, 1994; update of *Proc. of NATO Advisory Group for Aerospace Research and Development, Avionic Panel on Advanced Packaging Concepts for Digital Avionics*, San Diego, CA, June 8, 1994.
966. Ranganthan, M. and M. Pecht, "Development of an Automated Contact Resistance Probe," *27th Annual Connector and Interconnection Symp. and Trade Show*, IICIT, Inc., Boston, MA, pp. 369–375, Sept. 19–24, 1994.
967. Wong, W., and M. Pecht, "Introducing a Theory for the General Solution of Steiner's Problem in Manhattan Space," *Proc. of the First Int'l. Symp. on Microelectronic Package and PCB Technology*, Beijing, China, pp. 114–115, Sept. 19–23, 1994.
968. Bauernschub, R., Lall, P. and M. Pecht, "A Physics-of-Failure Approach to Addressing Defect Related Reliability," *6th Int'l. Electronics Manufacturing Technology Symp.*, La Jolla, CA, pp. 38–49, Sept. 12–14, 1994.
969. Pecht, M., Dasgupta, A., Ogunjimi, A. and J. Evans, "Computational Methods to Address Reliability of Electronic Packaging, Computational Mechanics for Electronic Devices/Components," *Proc. of the Int'l. Symp. on Highly Advanced Computing '94*, Chiba, Japan, pp. 145–176, Aug. 4–5, 1994.
970. Rudra, B., Pecht, M. and D. Jennings, "Assessing Time-to-Failure Due to Conductive Filament Formation in Multi-Layer Organic Laminates," *IEEE Transactions on Components, Packaging and Manufacturing Techniques B*, Vol. CPMTB-17, pp. 269-276, Aug. 1994; Extension of Pecht, M., Wu, B. and D. Jennings, "Conductive Filament Formation in Printed Wiring Boards," 1*3th IEEE Int'l. Electronics Manufacturing Technology Symp.*, pp. 74–79, 1992.
971. Pecht, M. and F. Nash, "Predicting the Reliability of Electronic Equipment," *Proc. of the IEEE*, Vol. 82, No. 7, pp. 992–1004, July 1994.
972. Li, M., Gohari, K. and M. Pecht, "Effect of Temperature and Humidity Cycling on FR-4, Bis-Maleimide Triazine, and Cyanate Ester Printed Wiring Boards," *7th Int'l. SAMPE Electronics Conf.*, pp. 446–457, June 20–23, 1994.
973. Bhagath, S. and M. Pecht, "Probing Connector Reliability," *Connector Specifier*, pp. 32–34, June 1994.
974. Hu, J., Barker, D., Ghoshtagore, R. and M. Pecht, "Investigation of Thermomechanical Properties of Low Temperature Cofired Ceramic," *Transactions of the ASME*, Vol. 116, No. 2, pp. 148–153, June 1994.
975. Condra, L., Kromholtz, G., Pecht, M., and E. Hakim, "Using Plastic-Encapsulated Microcircuits in High Reliability Applications," *Proc. 1994 Annual Reliability and Maintainability Symp.*, pp. 481–488, Jan. 1994.
976. Sandborn, P. and D. Herrell, *Electronic Module Technology, Physical Architecture and Packaging of Microelectronic Systems*, R. Hannemann, A. Kraus and M. Pecht editors, John Wiley, New York, NY, pp. 189–249, 1994.
977. Condra, L., O'Rear, S., Freedman, T., Flancia, L., Pecht, M. and D. Barker, "Comparison of Plastic and Hermetic Microcircuits under Temperature-Humidity Bias," *Proc. Annual Reliability and Maintainability Symp.*, 1994.
978. Bhagath, S. and M. Pecht, "Modeling the Effects of Mixed Flowing Gas Corrosion and Stress Relaxation on Contact Interface Resistance," *ASME Journal of Electronic Packagin*g, Vol. 115, No. 4, pp. 404–409, Dec. 1993.
979. Weil, L., Pecht, M. and E. Hakim, "Reliability Evaluation of Plastic Encapsulated Parts," *IEEE Transactions on Reliability*, Vol. 42, No. 4, pp. 536–540, Dec. 1993.
980. Pecht, M., Agarwal, R. and D. Quearry, "Plastic Packaged Microcircuits: Quality, Reliability, and Cost Issues," *IEEE Transactions on Reliability*, Vol. 42, No. 4, pp. 513–517, Dec. 1993.

981. Condra, L., Wenzel, G. and M. Pecht, "Reliability Evaluation of Simple Logic Microcircuits in Surface Mount Plastic Packages," *Proc. of the ASME Winter Annual Meeting*, New Orleans, LA, Nov. 1993.
982. Condra, L., Wenzel, G. and M. Pecht, "Reliability Evaluation of Simple Logic Microcircuits in Surface Mount Plastic Packages," EEP-Vol. 6, *Electronic Packaging Reliability*, pp. 85–100, Nov. 1993.
983. Lall, P., Pecht, M. and E. Hakim, "Derating Guidelines for Temperature-Tolerant Design of Microelectronics," *6th Int'l. Conf. Quality in Electronic Components Failure Prevention, Detection and Analysis; 4th European Symp. on Reliability of Electron Devices, Failure Physics and Analys*is, Bordeaux, France, Oct. 4–7, 1993.
984. Pecht, M. and P. Lall, "An Integrated Physics-of-Failure Approach to Reliability Assessment," Proc. of the *ASME Int'l. Electronics Packaging Conf*., Binghamton, NY, Sept. 29–Oct. 2, 1993.
985. Li, M. and M. Pecht, "Dynamic Investigation of Thermal and Sorptive Effects on Electronic Packages," *Proc. of the ASME Int'l. Electronics Packaging Conf*., Sept. 1993.
986. Lall, P., Pecht, M. and E. Hakim, "Computer-Aided Reliability Simulation, Design and Assessment of MCMs: A Physics of Failure Approach," *1993 Advanced Microelectronics Technology Qualification, Reliability, and Logistics Workshop*, Denver, CO, Aug. 24–26, 1993.
987. Lall, P. and M. Pecht, "Physics of Failure Based Computer Tools for Design of Microelectronic Packages," *3rd Int'l. Microelectronics and Systems '93 Conf*., Kuala Lumpur, Malaysia, Aug. 10–13, 1993.
988. Pecht, M., Cushing, M. and E. Hakim, "Design Approach to Reliable Microelectronic Packages," *Proc. 9th European Hybrid Microelectronics Conf*., pp. 484-492, Nice, France, June 2–4, 1993.
989. Lall, P., Pecht, M. and E. Hakim, "Thermal Derating Guidelines for Temperature-tolerant Design of Micro Electronic Devices," *ESREF* (Bordeaux, France), 1993.
990. Hu, J., Pecht, M. and A. Dasgupta, "Design of Reliable Die Attach," *Int'l. Journal Microcircuits and Electronic Packaging*, Vol. 16, No. 1, pp. 1–21, 1st Qtr, 1993.
991. Pecht, M., She, J. and D. Barbe, "Evaluating Terminal Pair System Reliability," *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, Vol. E76-A, No. 4, pp. 555–564, 1993.
992. M. Pecht, "Design for Qualification," *Proc. 1993 Annual Reliability and Maintainability Symo*., pp. 1–4, Jan. 1993.
993. Pecht, M., Barker, D. and A. Dasgupta, "An Approach to the Development of Package Design Guidelines," *ISHM*, pp. 28-45, Nov./Dec. 1992, also Pecht, M., Barker, D. and A. Dasgupta, "An Approach to the Development of Package Design Guidelines," *ISHM*, Vol. 16, No. 3, pp. 217-240, 3rd Qtr 1993; extension of M. Pecht, "Advances in the Design and Assessment of Reliable Electronics Using Concurrent Engineering," *Proc. 47th Mechanical Failure Prevention Group*, pp. 51–55, 1993.
994. Pecht, M. and E. Hakim, "The Future of Military Standards - A Focus on Electronics," *IEEE Aerospace and Electronic Systems*, Vol. 17, No. 7, pp. 16–19, 1993; update of Proc. IEEE NAECON'92, Vol. 2, pp. 795–799, 1992.
995. Pecht, M., Malhotra, A., Wolfowitz, D., Oren, M. and M. Cushing, "Transition of MIL-STD-785 from a Military to a Physics-of-failure based Com-military Document," *9th Int'l. Conf. of the Israel Society for Quality Assuranc*e, Jerusalem, Israel, Nov. 16–19, 1992.
996. Condra, L., O'Rear, S., Freedman, T., Flancia, L., Pecht, M. and D. Barker, "Comparison of Plastic and Hermetic Microcircuits Under Temperature Cycling and Temperature-Humidity-Bias," *IEEE Transactions on Components, Hybrids and Manufacturing Technology*, Vol. CHMT-15, pp. 640–650, Oct. 1992.
997. Condra, L., Johnson, G., Pecht, M. and A. Christou, "Estimating the Vibration Fatigue Life of Quad Leaded Surface Mount Components," *IEEE Transactions on Components, Hybrids, and Manufacturing Technology*, Vol. 15, No. 4, Aug. 1992.
998. Condra, L., Johnson, G., Pecht, M. and A. Christou, "Evaluation of Manufacturing Variables in the Reliability of Surface Mount Capacitors," *IEEE Transactions on Components, Hybrids and Manufacturing Technology*, Vol. CHMT-15, pp. 542–552, Aug. 1992.
999. Fan, M., Christou, A. and M. Pecht, "Two-Dimensional Thermal Modeling of Power Monolithic Microwave Integrated Circuits," *IEEE Transactions on Electron Device*, Vol. 39, No. 5, pp. 1075–1079, May 1992. Systems Magazine, pp. 16-19, July 1992.
1000. Bonadies, G. and M. Pecht, "A Computer Integrated Product Development Environment," *The Fabricator Magazine*, April 1993; update of *Society for Computer-Aided Engineering (SCAE) Magazine*, July 1992; update of CE & CALCE '92, pp. 151–164, June 1–4, 1992.
1001. Pecht, M. and P. Lall, "A Physics of Failure Approach to Burn-In," *ASME/JSME Joint Conf. on Electronic Packaging*, Vol. 2, pp. 917–923, April 1992.

1002. Arora, A., Pecht, M. and A. Dasgupta, "Design Guidelines for Leads of Microelectronic Packaging," *Proc. SMTCON*, pp. 89-100, April 1992.
1003. Shan, X., Agarwal, R. Pecht, M. and J. Evans, "Effect of Humidity Cycling on Reliability of Overlaid High Density Interconnects," *1992 IEEE Multi-chip Module Conf.*, pp. 106–109, March 1992.
1004. She, J. and M. Pecht, "Reliability of k-out-of-n Standby System With Dormant Failures," *IEEE Transactions on Reliability*, Vol. 41, No. 1, pp. 72–75, March 1992.
1005. Pecht, M. and D. Weiss, "Education in Reliable Electronic Packaging," *Proc. 1992 Annual Reliability and Maintainability Symp.*, pp. 144–149, Jan 1992.
1006. Agarwal, R., Pecht, M., Shan, X. and J. Evans, "Potential Failure Mechanism in Overlaid High Density Interconnects," *ISHM-IEPS Proc. 92, Int'l. Conf. Multichip Modules*, pp. 361–367, 1992.
1007. Bhandarkar, S., Dasgupta, A., Barker, D., Pecht, M. and W. Engelmaier, "Influence of Selected Design Variables on Thermomechanical Stress Distributions in Plated-Through-Hole Structures," *ASME Journal of Electronic Packaging*, Vol. 114, No. 1, pp. 8–13, 1992.
1008. Shan, X., Pecht, M. and A. Christou, "Corrosion Modeling in Microelectronic Devices," *Int'l. Journal of Microcircuits and Electronic Packagin*g, Vol. 1, pp. 1–10, 1992.
1009. Wolfovitz, D., Barker, D. and M. Pecht, "Role and Measurement of Trimming Shock on Component Leads," *13th IEEE Int'l. Electronics Manufacturing Technology Symp.*, pp. 64–67, 1992.
1010. Barker, D., Sharif, I., Dasgupta, A. and M. Pecht, "Effect of SMC Lead Dimensional Variabilities on Lead Compliance and Solder Joint Fatigue Life," *ASME Journal of Electronic Packaging*, Vol. 114, pp. 177–184, 1992; update of Mechanics of Surface Mount Assemblies Sym., ASME/WAM, Atlanta, GA, Dec. 1–6, 1991.
1011. Pourbabai, B. and M. Pecht, "Management of Design Activities in a Concurrent Engineering Environment," *Int'l. Journal of Production Research*, Vol. 32, No. 4, pp. 821–832, 1994; update of *CALS & CE '91*, pp. 171–190, June 10–14, 1991.
1012. Dasgupta, A., Oyan, C., Barker, D. and M. Pecht, "Solder Creep-Fatigue Analysis by an Energy-Partitioning Approach," *ASME Journal of Electronic Packaging*, Vol. 114, pp. 152–160, 1992; Presented at Mechanics of Surface Mount Assemblies Sym., ASME/WAM, Atlanta, GA, Dec. 1–6, 1991.
1013. Pecht, M., Watts, J. and S. Balakrishnan, "Placement Design for Producibility," *Journal of Electronics Manufacturing*, Vol. 1, No. 2, pp. 61–76, 1992; update of Watts, J. and M. Pecht, "Placement for Producibility and Assembly: Information Requirements," *9th IEEE Int'l. Manufacturing Technology Symp.*, pp. 340–349, Oct. 1–3, 1990.
1014. Barker, D., Dasgupta, A. and M. Pecht, "PWB Solder Joint Life Calculations Under Thermal and Vibrational Loading," *Journal of the Institute Environmental Sciences*, Vol. 35, No. 1, pp. 17–25, 1992; update of *Proc. 1991 Annual Reliability and Maintainability Symp.*, pp. 451–459, Jan. 1991; extension of Hakim, J., Pecht, M. and D. Barker, "Design and Analyses of Electronic Assemblies Using CALCE Software Version 3.0," *Proc. 1991 Institute of Environment Science*, pp. 36–40, May 6–10, 1991.
1015. Dasgupta, A., Bhandarkar, S., Pecht, M. and D. Barker, "Effective Properties of Fiber Composites with Multiple Interphases," *Composites*, Albany, NY, pp. 1044–1053, Oct. 6–9, 1991.
1016. Pecht, M. and H. Haslach, "A Viscoelastic Constitutive Model for Constant Rate Loading at Different Relative Humidities," *Mechanics of Materials*, Vol. 11, pp. 337–345, 1991; extension of Haslach, H., Pecht, M. and X. Wu, "Variable Humidity and Load Interaction in Tensile Creep of Paper," *1991 Int'l. Paper Physics Conf.*, Kailua-Kona, Hawaii, Sept. 22–27, 1991; update of Haslach, H., Pecht, M. and X. Wu, "A Viscoelastic Model for Variable Humidity Loading in Creep," *Proc. ASME Winter Annual Meeting*, AMD - Vol. 112, MD - Vol. 23, pp. 1–7, 1990.
1017. Dasgupta, A. and M. Pecht, "Material Failure Mechanisms and Damage Models," *IEEE Transactions on Reliability*, Vol. 40, No. 5, pp. 531–536, Dec 1991.
1018. Agarwal, A., Dasgupta, A., Pecht, M. and D. Barker, "Prediction of PWB/PCB Thermal Conductivity," *Int'l. Journal Hybrid Microelectronics*, Vol. 14, No. 3, pp. 83–95, Sept. 1991.
1019. Hu. J., Pecht, M. and A. Dasgupta, "A Probabilistic Approach for Prediction of Thermal Fatigue Life of Wire Bonding in Microelectronics," *ASME Journal of Electronic Packaging*, Vol. 113, No. 3, pp. 275–285, Sept. 1991.
1020. Condra, L. and M. Pecht, "Commercial Microcircuit Options in Military Avionics Systems Demand Reliability," *Defense Electronics*, pp. 43–47, Aug. 1991.
1021. Christou, A., Dasgupta, A., Pecht, M. and D. Barker, "Design Optimization of High Temperature Electronic Packaging," *Transactions of the High Temperature Electronics Conf.*, Albuquerque, NM, pp. 10–15, June 16–20, 1991.

1022. Oyan, C., Dasgupta, A., Pecht, M. and D. Barker, "Role of Strain-Partitioning Analysis in Solder Life Prediction," *Int'l. Journal Hybrid Microelectronics*, Vol. 14, No. 2, pp. 37–47, June 1991.

1023. Barker, D., Pecht, M., Dasgupta, A. and S. Bhandarkar, "Transient Thermal Stress Analysis of Plated Through Holes Subjected to Wave Soldering," *ASME Journal of Electronic Packaging*, Vol. 113, No. 2, pp. 149–155, June 1991; update of *Proc. ASME Winter Annual Meeting*, 90-WA/EEP-4, Oct. 25–29, 1990.

1024. Sharif, I., Barker, D., Dasgupta, A. and M. Pecht, "Fatigue Analysis of a Planarpak Surface Mount Component," *ASME Journal of Electronic Packaging*, Vol. 113, No. 2, pp. 194–199, June 1991; update of *Proc. ASME Winter Annual Meeting*, 90-WA / EEP-4, Oct. 25–29, 1990.

1025. Biegel, P. and M. Pecht, "Design Trade-Offs," *Journal Concurrent Engineering*, Vol. 1, No. 3, pp. 29–40, May/June 1991.

1026. Lamb, C., Braunberg, G. and M. Pecht, "True Temperature Measurement of Complex Devices Using Infrared Thermography," *Printed Circuit Design*, Vol. 8, No. 3, pp. 20–24, March 1991.

1027. Pecht, M., Barker, D., Christou, A. and A. Dasgupta, "Reliability and Maintainability Issues in Electronics Design," *NEPCON-WEST '9*1, Vol. 2, pp. 943-948, Feb. 24–26, 1991.

1028. Leonard, C. and M. Pecht, "Improved Techniques For Cost Effective Electronics," *Proc. 1991 Annual Reliability and Maintainability Symp.*, pp. 174–182, Jan. 1991; update of *"How Failure Prediction Methodology Affects Electronic Equipment Design," *Quality and Reliability Engineering Int'l*., Vol. 6, No. 4, pp. 243–250, Oct. 1990; presented at *Power Conversion and Intelligent Motion Conf*., Long Beach, CA, Oct. 16–19, 1989, update of "Failure Prediction Methodology Calculations Can Mislead: Use Them Wisely, Not Blindly," *Proc. 89 IEEE NAECON Conf*., Vol. 3, pp. 1887–1892, May 22-24, 1989.

1029. Hu, J. and M. Pecht, "Temperature Dependence of the Mechanical Properties of GaAs Wafers," *ASME Journal of Electronic Packaging*, Vol. 113, No. 4, pp. 331–336, 1991; extension of Hu, J., Pecht, M. and D. Barker, "Experimental Evaluation of Mechanical Behavior of GaAs Wafer Material," *Proc. of the 1991 Spring Meeting of the Material Research Society*.

1030. Pecht, M., She, J., Hu, J. and K. Richter, "Minimizing Life Cycle Costs," *Journal of Concurrent Engineering*, Vol. 1, No. 4, pp. 11–24, 1991; update "Concurrent Design for Scheduled Maintenance," K. Richter, M. Pecht, *Proc. 6th Annual RAMCAD Conf*., pp. 152–166, April 26, 1990.

1031. Wu, X., Hu, J. and M. Pecht, "Fuzzy Regression Analysis For Fatigue Crack Growth," *Proc. ISUMA '90 Symp. on Uncertainty Modeling and Analysis*, pp. 437–440, Dec. 3-5, 1990.

1032. Pecht, M., Dasgupta, A., Barker, D. and C. Leonard, "The Reliability Physics Approach to Failure Prediction Modeling," *Quality and Reliability Engineering Int'l.*, Vol. 6, No. 4, pp. 267–274, Oct. 1990; update of "Reliability Prediction Methodologies," *Proc. Int'l. Sym. Reliability and Maintainability-1990-Tokyo*, pp. 25-30, 1990*; update of "Practical Approaches to Microelectronic Package Reliability Prediction Modeling," Lall, P., Barker, D., Dasgupta, A., Pecht, M., and S. Whelan, *Proc. Int'l. Society Hybrid Microelectronics*, pp. 126–130, Baltimore, MD, Oct. 17–19 1989; update of "Reliability Prediction Methodologies, Pecht," M., Barker, D., Dasgupta, A., and C. Leonard, *Proc. Concurrent Engineering of Mechanical Systems*, Vol. 1, pp. 295–302, Oct. 1989.

1033. Tan, C., and M. Pecht, "A Zonal Decomposition Methodology for Detailed Temperature Field Evaluation," *ASME Journal of Electronic Packaging*, Vol. 112, No. 3, pp. 260–266, Sept. 1990.

1034. Osterman, M. and M. Pecht, "Placement for Reliability and Routability of Convectively Cooled PWBs," *IEEE Transactions on CAD Integrated Circuits and Systems*, Vol. 9, No. 7, pp. 734–743, July 1990; update of "Component Placement on PWB's for Routability and Reliability," *Proc. Mechanical Failure Prevention Conf., National Bureau of Standards*, Sept. 15–17, 1987.

1035. Dasgupta, A., Bhandarkar, S., Barker D. and M. Pecht, "Thermoelastic Properties of Woven-Fabric Composites Using Homogenization Techniques," *Proc. 5th American Society for Composites*, June 11–14, 1990.

1036. M. Pecht, "A Model for Moisture Induced Corrosion Failures in Microelectronic Packages," *IEEE Transactions on Components, Hybrids and Manufacturing Technology*, Vol. CHMT-13, pp. 383–389, June 1990.

1037. Pecht, M., and W. Ko, "A Corrosion Rate Equation for Microelectronic Die Metallization," *Int'l. Journal for Hybrid Microelectronics*, Vol. 13, No. 2, pp. 41–52, June 1990.

1038. Tsujioka, N., M. Pecht, and D. Jennings, "Generative Mechanisms and Preventive Methods for Micro-Defects in PCB," *Proc. of the Printed Circuit World Convention*, Aylesbury, UK, pp. 3–12, 1990 (Hazell Books, 1990, B2).

1039. Vodzak, J., Barker, D., Dasgupta, A. and M. Pecht, "Combined Vibrational and Thermal Solder Joint Fatigue - A Generalized Strain Versus Life Approach," *ASME Journal of Electronic Packaging*, Vol. 112, No. 2, pp. 129–134, June 1990; presented at the ASME Winter Annual Meeting, 89-WA/EEP-35, San Francisco Dec. 1989.

1040. Dasgupta, A., D. Barker and M. Pecht, "Reliability Prediction of Electronic Packages," *Journal of Institute of Environmental Sciences*, Vol. 33, No. 3, pp. 36–45, May/June 1990 (won best journal paper of the year); update of *Proc. 36th Reliability and Maintainability Symp.*, pp. 323–330, Jan. 23–25, 1990.

1041. Whelan, S., M. Pecht, and A. Dasgupta, "Operational Temperature Cycle Values for Application Environment Categories," *Int'l. Journal Hybrid Microelectronics*, Vol. 13 No. 1, pp. 6–11, March 1990.

1042. Deshmukh, G. and M. Pecht, "A Modified Powell's Method for Six-Degrees-of-Freedom Platform Kinematics," *Journal of Computers and Structures*, Vol. 34, No. 3, pp. 485–492, March 1990.

1043. Hevner, A., Basu, A., Pecht, M., and B. Pourbabai, "A Methodology for Concurrent Product Development with a Focus on Electronic Products," *Proc. of the Second National Sym. on Concurrent Engineering*, Morgantown, West Virginia, Feb. 7–9, 1990.

1044. Pecht, M., Lall, P. and S. Whelan, "Temperature Dependence of Micro Electronic Device Failures," *Quality and Reliability Engineering Intl*, Vol. 6, pp. 275–284, 1990.

1045. Pecht, M., Dasgupta D., and P. Lall, "A Failure Prediction Model for Wire Bonds," *Proc. Int'l. Society Hybrid Microelectronics*, pp. 607–613, Baltimore, MD, Oct. 17–19, 1989.

1046. Genberg, S. and M. Pecht, "Acceleration Sensors for Solid State Electronic Safety and Arming Devices," *Int'l. Journal Hybrid Microelectronics*, Vol. 12, No. 3, pp. 126–138, Sept. 1989.

1047. Wong, Y. and M. Pecht, "Approximating the Steiner Tree in the Placement Process," *ASME Journal of Electronic Packaging*, Vol. 111, No. 3, pp. 228–235, Sept. 1989.

1048. M. Pecht, "On A Life Cycle Engineering Approach to Concurrent Design," *28th Annual Technical Symp. of the ACM, NIST*, pp. 35–41, Aug. 24, 1989.

1049. Tan, C., Pecht, M. and Z. Dun, "Pressure Gradient Method for Solving Incompressible NavierStokes Equations with Curvilinear Coordinator System," *Mathematical Computational Modeling*, Vol. 14, pp. 732–736, 1990, update of *7th Int'l. Conf. on Math and Computer Modeling*, Chicago, Aug. 2–5, 1989.

1050. Haslach H. and M. Pecht, "Thermodynamic Modeling LoadSorption Relations in Cellulosic Materials," *ASME Mechanics of Cellulosic and Polymeric Materials*, AMD-Vol. 99, MDVol. 13, pp. 15–22, July 1989; extension of Haslach, H., Khan, S., Mohammed, S. and M. Pecht, "Behavior of Virginia Fiber Paper as Influenced by Relative Humidity," *ASME Symp. on Mechanics of Cellulosic and Polymeric Materials*, AMDVol. 99, MD-Vol. 13, pp. 162–172, July 9–12, 1989.

1051. Pecht, M. and M. Osterman, "The Effect of a Varying Moisture Content on the Creep of Hydrophilic Polymers," *ASME AMD*Vol. 82, Book No. H00375, pp. 84–89, June 1989.

1052. Dancer, D. and M. Pecht, "Component-Placement Optimization for Convectively Cooled Electronics," *IEEE Transactions on Reliability*, Vol. 38, No. 2, pp. 199–205, June 1989.

1053. Osterman, M. and M. Pecht, "Component Placement for Reliability on Conductively Cooled Printed Wiring Boards," *ASME Journal of Electronic Packaging*, Vol. 111, No. 2, pp. 149–156, June 1989.

1054. Gore, J., DiMarzo, M., Resch, C. and M. Pecht, "Verification of Thermal Analysis of PWBs for RAMCAD," *Proc. 1989 Annual Reliability and Maintainability Symp.*, pp. 474–478, Jan. 23–26, 1989.

1055. M. Pecht, "On a Life Cycle Engineering Approach to Concurrent Design," *28th Annual Technical Symp. of the ACM, NIST*, pp. 35–41, 1989.

1056. Pecht, M. and R. Cogan, "Intelligent Derating for Reliability," *Printed Circuit Design*, Vol. 6, No., pp. 48–55, 1989; presented at *Third IEEE Int'l. Symp. Intelligent Control*, Aug. 24–26, 1988.

1057. Pecht, M. and W. Kang, "A Critique of MILHDBK 217E Reliability Prediction Methods," *IEEE Transactions on Reliability*, Vol. 37, No. 5, pp. 453–457, Dec. 1988.

1058. Pecht, M., Azarm, S. and S. Praharaj, "Optimized Redundancy Allocation for Electronic Equipment," *Journal of Engineering Optimization*, Vol. 14, pp. 101–114, Dec. 1988; update of "A Methodology for Component Allocation on a PWB Workspace," *Proc. of 34th Annual Institute Environmental Sciences Conf.*, May 1988.

1059. Pecht, M., Barker, D., Lynch, J. and A. Leone, "An Expert System for Electronics Design and Analysis," *Proc. of 1988 ASME Computers in Mechanical Engineering Conf.*, San Francisco, Aug. 1–4, 1988. Update of Naft, J. and M. Pecht, "A RAMCAD/ULCE Workstation Shell Structure," *1987 Annual Reliability and Maintainability Sym.*, pp. 91–96, Jan. 27–29, 1987; extension of Pecht, M., Naft, J. and M. Palmer, "Workstation Requirements For Printed Wiring Board Design," *IEEE Workstation Technology and Systems Conf.*, Vol. 1, pp. 63–68, 1986.

1060. Pecht, M., and C. Resch, "Temperature Measurement of Conductively Cooled Printed Wiring Boards Using Infrared Techniques," *Proc. of 19th Annual Modeling and Simulation Conf.*, May 5–6, 1988.

1061. Braunberg, G., Naft, J., Madison, L. and M. Pecht, "Computer Aided Life Cycle Engineering," *Proc. of 1988 Annual Reliability and Maintainability Sym*., pp. 26–30, Jan. 26–28, 1988.

1062. Osterman, M. and M. Pecht, "Placement of Integrated Circuits for Reliability on Conductively Cooled Printed Wiring Boards," *ASME Winter Annual Meeting*, pp. 1–9, Dec. 13–18, 1987.

1063. M. Pecht, "What Research is Underway to Advance R & M Automation for Electronics," *IEEE Transactions on Reliability*, Vol. R36, No. 5, pp. 516–520, Dec. 1987.

1064. M. Pecht, "CALCE/RAMCAD for Electronics," IEEE Transactions on Reliability, Vol. R-36, No. 5, pp. 501–505, Dec. 1987; extension of Clark, G., Pecht, M. and B.T. Sawyer, "An Expert System For Electronics Design," *Proc. IEEE 3rd Annual Expert Systems in Government Conf*., Oct. 19–23, 1987; update of Pecht, M., Sawyer, B. and J. Naft, "A Mechanical Engineering Perspective on PWB Design for Reliability," *Proc. Mechanical Failure Prevention Conf., National Bureau of Standards*, Sept. 15–17, 1987; extension of M. Pecht, "Computeraided Design for PCB Reliability," *Proc. Institute of Environmental Sciences 33rd Annual Con*f., pp. 141–146, May 4–8, 1987; extension of Pecht, M. and B. Sawyer, "PCB Design for Thermal Reliability," *Printed Circuit Design Journal*, Vol. 4, No. 5, pp. 12, 1987*; update of "Thermal Reliability Management in PCB Design," Pecht, M. Palmer, M. and J. Naft. *Proc. 1987 Annual Reliability and Maintainability Sym*., p. 312, Jan. 27–29, 1987; update of Pecht, M., Palmer, M. and J. Horan, "Computeraided Heat Sink Design for Printed Wiring Boards," *IEEE Int'l. Conf. on Computer Aided Design*, ICCAD-85, Vol. 1, pp. 253–256, 1985.

1065. Pan, Y., Radermacher, R. and M. Pecht, "CAD for Thermodynamic Cycles," *ASME Computers in Mechanical Engineering Journa*l, Vol. 6, No. 2, pp. 38–45, 1987.

1066. Azarm, S. and M. Pecht, "Knowledge Gathering for Heuristic Programming in Design Optimization," *Journal of Engineering Optimization*, Vol. 11, pp. 317–326, 1987.

1067. Azarm, S. and M. Pecht, "A Coupled AlgorithmicHeuristic Approach for Design Optimization," *IEEE Transactions on Systems, Man and Cybernetics*, Vol. 17, No. 2, pp. 289–293, 1987.

1068. Pecht, M., Palmer, M., Schenke, W. and R. Porter, "An Investigation Into PWB Component Tradeoffs," *IEEE Transactions on Reliability*, Vol. R36, No. 5, pp. 524–527, 1987.

1069. Minis, I., Pandelidis, I. and M. Pecht, "Simulation of the Chatter Phenomenon in Metal Cutting," *IASTED: Computer Aided Design and Applications*, Vancouver, Canada, pp. 100-103, June 5–7, 1986.

1070. Pecht, M., Price, T. and I. Pandelidis, "The Design of a Generic Gimbel," *IASTED: Computer Aided Design and Applications*, Vancouver, Canada, pp. 110–113, June 5–7, 1986.

1071. Pecht, M. and M. Osterman, "Design and Simulation of a Tactile Sensing System," *Proc. IEEE Modeling and Simulation Conf*., Vol. 17, No. 2, pp. 727–729, April 22–25, 1986.

1072. Azarm, S. and M. Pecht, "Approach for Building a Rulebased System for Design Optimization," *Computer Aided Optimal Design*, Vol. 3, pp. 363–383, 1986; extension of Azarm, S. and M. Pecht, "Application of a Rulebased System in Nonlinear Programming," *Joint National Meetings of the Institute of Management Science and Operation Research Society of America*, CA, April 1416, 1986; extension of Horan, J., Palmer, M., Pecht, M. and Y. Wong, "Intelligent Design of Printed Wiring Boards," *Association for Computing Machinery*, Vol. 1, pp. 123–128, 1985; extension of Azarm, S. and M. Pecht, "Towards Intelligent Design Optimization," *IEEE Artificial Intelligence in Engineering Conf*., Oct. 21–23, 1985.

1073. Pandelidis, I., Pecht, M. and I. Minis, "Active Compliance of a Robot Manipulator," *IASTED Robotics and Automation*, Vol. 1, pp. 127–129, 1986.

1074. Palmer, M., Pecht, M. and J. Horan, "Adapting the Spreadsheet to Engineering Problems," *ASME Computers in Mechanical Engineering Journal*, Vol. 4, No. 2, pp. 49–56, 1985; update of "Towards an Engineering Spreadsheet," *ASME Computers in Mechanical Engineering*, Vol. 3, pp. 143-150, 1985.

1075. M. Pecht, "Creep of RegainRheologically Simple Hydrophilic Polymers," *Journal of Strain Analysis*, Vol. 20, No. 3, pp. 179–181, 1985.

1076. Pecht, M. and M. Johnson, Jr., "The Strain Response of Paper Under Various Constant Regain States," *TAPPI Journal (Paper Physics)*, Vol. 68, No. 1, pp. 90–93, 1985.

1077. M. Pecht, "Aging of Thermoplastics," *Mechanics Research Communications*, Vol. 12, No. 1, pp. 11–18, 1985.

1078. Pecht, M., Johnson, Jr., M. and R. Rowlands, "Constitutive Equations for the Creep of Paper," *TAPPI Journal (Paper Physics)*, Vol. 67, No. 5, pp. 106–109, 1984; extension of Pecht, M., and M. Johnson, "The Mechanical Response of Cellulosic Paper Sheets Under Various Constant Regain States," *Southeastern Conf. on Theoretical and Applied Mechanics*, SECTAM XII, Vol. 1, pp. 548–553, 1984.

Monographs, Reports, and Extension Publications

1. Morillo, C., S. Menon, A. Pearl, P. Chauhan, M. Osterman, M. Pecht, and J. Hay, "In Situ Young's Modulus and Strain-Rate Sensitivity of Lead-Free SAC 105 Solder," Agilent Technologies, Application Note, Mar. 2013.
2. Pecht, M., R. Kaczmarek, X. Song, D. Hazelwood, R. Kavetsky, and D. Anand, "Rare Earth Materials: Insights and Concerns," Circuitnet, white paper, Oct 2012.
3. Kostoff RN, Briggs, MB Rushenberg, RL, Bowles, CA, Pecht, M., "The Structure and Infrastructure of Chinese Science and Technology," DTIC Technical Report ADA443315, Defense Technical Information Center, Ft. Belvoir, VA, 2006.
4. Editorials in IEEE Transactions on Components and Packaging Technologies: "Open Forum: Editorial," 4 per year, [1996 - 2010].
5. "Electronics Manufacturing in Hong Kong and China," Boulton W., Pecht M., Hodges D., E. Vardaman, Int'l Technology Research Institute, Baltimore, MD, Sept. 2000.
6. IEC-Q-AWG Guide Development: Guide for Component Management Plans, Guide for Using Semiconductor Devices Outside Manufacturers' Specified Temperature Ranges, Guide for Reliability Assessment of Electronic Equipment, 2000.
7. Benchmarking Nortel's Processes, PACE's Qualification Methodology Group, Sept. 1998.
8. Boulton, W.R., Pecht, M., Tucker, W. and S. Wennberg, Singaporean and Malaysian Electronics Industries, Chapter 4, WTEC Panel Report on Electronic Manufacturing in the Pacific Rim, Loyola College, MD, pp. 49-64, May 1997.
9. Xerox Project: Distributed Filament Contacts, Xie, J., Pecht, M., Swift, J. and S. Wallace, Nov. 1996-May 1997.
10. The Aries Project for Rule-Based-Design Knowledge Acquisition, Institute for Defense Analyses, May 1995.
11. Special Technology Area Review on Electronics Packaging, Report of Dept. of Defense, Advisory Group on Electron Devices, contributor, July 1993.
12. "First Principles of Concurrent Engineering: A Competitive Strategy for Product Development," National Security Industrial Association, 1 of 12 contributors, May 12, 1992.
13. "Assessment and Qualification of Advanced Packaging and Interconnects," NASA, April 1992.
14. "Design and Assessment Issues for Modern Cost Effective Military Electronics," Pecht, M., Shan, X., Lall, P. and R. Agarwal, David Taylor Laboratories, Nov 1991.
15. "Reliability Analysis/Assessment of Advanced Technologies," Rome Air Development Center, Air Force Systems Command, RADCTR9072, May 1990.
16. Computer Aided Life Cycle Engineering at the University of Maryland, Pecht, M. and D. Barker, in The CALS Report, edited by William Beazley, Pasha Publications, Rosslyn, VA, 1989; update of R&M in the Context of Interdisciplinary Research, Pecht, M., Dasgupta, A. and D. Barker, Proc. Concurrent Engineering of Mechanical Systems, Vol. 1, pp. 353368, Oct. 1989; update of CALCE Research Opportunities at the University of Maryland, Pecht, M., Barker, D. and D. Weiss, Proc. 1989 IEEE Int. Electronic Manufacturing Sym., pp. 182185, San Francisco, Sept. 2527, 1989*; update of Computer Aided Life Cycle Engineering at the University of Maryland, Pecht, M. and D. Barker, Proc. 5th Annual RAM/CAD Technical Interchange Meeting, San Diego, CA, pp.198212, April 1112 1989*; update of CALCE Center at the University of Maryland Helps Electronics Design Industries, Pecht, M. and D. Barker, CALS Report, Vol. 2 (8), pp. 1617, Aug. 1989.
17. "Decision Support Requirements in a Unified Life Cycle Engineering (ULCE) Environment," Vol II: Conceptual Approaches to Optimization, Vol III: Applications of Decision Support to Design, IDA Paper P2064, May 1988.
18. Free Convection Analysis for PCB's, Pezza, A., Pecht, M. and M. Palmer, Westinghouse Defense Electronics Center, DSC13673, Aug. 1986.
19. "The Effects of Component Placement on the Thermal Reliability of Conductively Cooled Printed Circuit Boards," Pecht, M. and M. Palmer, Westinghouse Defense Electronics Center, DSC13670, Apr. 1986.
20. CAE Program for Printed Wiring Board Thermal and Reliability Analysis, Pecht, M. and M. Palmer, Westinghouse Defense Electronics Center, DSC13650, Feb. 1986.
21. Sawyer, T. and M. Pecht, A Material Selection Program, BYTE: The Small Systems Journal, Vol. 11 (7), . 235-248, 1986; A Desktop Aid For Materials Selection, M. Pecht, Machine Design, pp. 164, Apr. 1987; update of MSP: A Material Selection Program, Pecht, M., Sawyer, T., Dieter, G. and Y. Pan, Proc. ASEE Computer Aided Engineering, Vol. 2, pp. 635-638, June 1985.
22. "A Thermal Analysis Interface to RacalRedac," Pecht, M., Palmer, M. and J. Horan, Westinghouse Defense Electronics Center, DSC-13467, Feb. 1985.
23. "Mechanical Response of Thermoplastics to Environmental Aging," II, Ramis, A., Sutton, R., Tenny, M. and M. Pecht, "Mechanical Response of Thermoplastics to Environmental Aging," I, Berringer, B., Cranston, J., LaValle, T., McGrath, P. and M. Pecht, "Experimental Creep Studies of the Effects of Aging on Thermoplastic AF1006," Gordon, L., Mary, B., Tyber, M., Wentzel, A. and M. Pecht, "A Study of the Effects of Environmental Conditioning of Isoplast 101 and Thermocomp GF1006," Bitting, R., Colle, P., Everhart, D., Naragfhi, M., Neshati, A., Simpson, K. and M. Pecht, NSWC Report, (Sections of NSWC TR 8516) Naval Surface Weapons Center, White Oak, MD, Dec. 1983.

Invited Talks, Lectures, and Keynote (invited*) Presentations

1. S. Maddipatla, M. Osterman, and M. Pecht, (2023, September 25–27). *Swelling in Pouch Lithium-ion Batteries* [Conference presentation]. International Conference on Renewable and Sustainable Energy (RENEWABLEENG 2023), Barcelona, Spain.
2. * "The Safety-related Challenges of Using Lithium-ion Batteries," Elsevier Webinar, Sept. 12, 2022
3. * "Lithium-ion Battery Safety", Consumer Protection Safety Commission (CPSC) Forum, Testimony and Panel, Bethesda, MD, July 27, 2023
4. * "Thoughts on Semiconductor Qualification, KAUST Semiconductor Forum 2023, Jeddah, Saudi Arabia, May 16 - 19, 2023.
5. * "Qualification Using AI", Technical University of the Philippines, Manila, Philippines, April 4, 2023
6. * "The Safety-related Challenges of Using Lithium-ion Batteries", Yokohama National University, Yokohama, Japan, March 29, 2023
7. * "The Safety-related Challenges of Using Lithium-ion Batteries", APEC Industry Session, Orlando, March 19-23, 2023
8. * "Do Cultural Differences Affect Friendships, Business Relations and Engineering Solutions", Chulalongkorn University, Bangkok, Thailand, Jan 9, 2023
9. * "The Safety-related Challenges of Using Lithium-ion Batteries", University of Moratuwa, Sri Lanka, Jan 4, 2023
10. * "The Safety-related Challenges of Using Lithium-ion Batteries", Ming Chi University, Taiwan, Dec. 29, 2022
11. * "AI and Humanness", Global Innovation Summit, Secretary for Innovation, Technology and Industry, HK, Dec 15, 2022
12. * "Do Cultural Differences Affect Friendships, Business Relations and Engineering Solutions", Hong Kong, Dec 18, 2022
13. * "The Safety-related Challenges of Using Lithium-ion Batteries," IEEE Electronics Packaging Society, Hong Kong, Nov. 9, 2022
14. * "The Safety-related Challenges of Using Lithium-ion Batteries", CAIRS, Hong Kong, Nov. 3, 2022
15. * "Using AI for Predicting System Reliability", IEEE: II Escuela Mexicana de Doctorado en Electrónica de Potencia, Mexico, September 1, 2022.
16. "The Use of Li-ion Batteries for a 50-Year Space Flight", Hector Beltran, Nancy J. Lindsey, and Michael Pecht, 2022 Conference on Advanced Power Systems for Deep Space Exploration (APS4DS), Virtual, August 30, 2022.
17. * "Advances in Semiconductor Qualification Methods", for Silicon Craft Inc. Thailand, August 15, 2022.
18. * "The Reliability Mistakes that Companies Make and Executives Accept", Tubutak, Istanbul, Turkey, June 21, 2022
19. * "The Safety Related Challenges with using Lithium-ion Batteries", BEV Fire Safety Workshop, MO, June 16, 2022
20. * "How Physics of Failure and Artificial Intelligence Concepts can be Used for Qualifying Electronic Components and Products", CAM: Failure Analysis Conference, Fraunhofer Institute, June 14-15, 2022
21. * "How Physics of Failure and Artificial Intelligence Concepts can be Used for Qualifying Electronic Components and Products", IEEE FEPPCON (Power Electronics Conference), Iceland, June 7-11, 2022
22. * "Using Artificial Intelligence to Ensure Product Reliability" , University of Arizona, Kececioglu Memorial Lecture, April 7, 2022
23. * "Life Extension of Electronics", 7th International Seminar: Climatic Reliability of Electronics, Denmark, March 3-4, 2022,
24. * "The Mistakes Quality and Reliability Engineers Make and Executives Accept", presentation to ASML, May 20, 2021.
25. * "Accelerated Test Planning of Li-ion Batteries", presentation to Stryker, May 3, 2021
26. * "Machine Learning Analysis of Lithium-ion Battery Electrochemical Impedance Spectra", Machine Learning for Batteries, NREL US Dept of Energy Conference, March 23-25, 2021
27. * "Why the IEC 60529 Water Protection Standard Must be Changed?", Conference on Climatic Reliability of Electronics: Global Challenges and Perspectives, Denmark, March 3-5, 2021.
28. * "Panel on Challenges and Opportunities for Green Energy Technology Deployment", 6th International Conference on Renewable Energy Generation and Applications, UAE, Feb 2-4, 2021
29. * "Predicting the Reliability of Electronics for a 50 Year Space Missions", AIAA SciTech Forum, Jan 11-15, 2021.
30. * "Using Artificial Intelligence Methods to Ensure Electronics System Reliability", Electronics Systems Integration Technology Conference, Vestfold, Norway, Sept 15 – 18, 2020
31. * "Cost Management Strategies and Approved Components List for Electronic Parts Management," International Webinar, The Knowledge Group Webinar Series, March 25, 2020.
11. * "Risks of Electrostatic Discharge in Medical Devices: Analysis of FDA's MAUDE Database," Webinar for ASHRAE Standard 170 Committee, Feb. 4, 2020.
12. * "Effects of Rest Time and Temperature on Li-ion Battery Degradation," Battery Safety Council Forum 8, Aging and

Reuse of Lithium-ion Batteries, Washington, DC, Nov. 19–20, 2019.

13. * "Breaking the Trust: How Companies Are Failing Their Customers," **Keynote Speaker**, *5th International Conference on Materials and Reliability (ICMR-2019)*, Jeju, Korea, Nov. 27–29, 2019.
14. * "Breaking the Trust: How Companies Are Failing Their Customers," **Keynote Speaker**, *4th International Conference on System Reliability and Safety (ICSRS 2019)*, Rome, Italy, Nov. 20–22, 2019.
15. * "Research and Innovation Trends in Artificial Intelligence," Dell Computers, Austin, TX, Nov. 8, 2019.
16. * "Research and Innovation Trends in Artificial Intelligence," University of Houston, Houston, TX, Nov. 6, 2019.
17. * "The Era of Embedded Intelligence," **Keynote Speaker**, *Computing, Communications and IoT Applications Conference* (ComComAp2019), Shenzhen University, Shenzhen, China, Oct. 27, 2019.
18. *"What the Best Companies are Doing in Reliability – AI-Based Reliability," **Keynote Speaker**, Arçelik 3rd Reliability Day, Istanbul, Turkey, Oct. 21, 2019.
19. "Investigation of Arcing in Cylindrical Li-ion Batteries," with Younguan Sun, *3rd International Battery Safety Workshop*, Tsinghua University, Beijing, China, Oct. 7–8, 2019.
20. * "The Use of UL 1642 in Impact Testing of High Capacity Li-ion Cells," **Keynote Speaker**, *3rd International Battery Safety Workshop*, Tsinghua University, Beijing, China, Oct. 7–8, 2019.
21. * "The Electrifying Pace of Automotive PHM," panel at: *11th Annual Conference of the Prognostics and Health Management Society (PHM2019)*, Scottsdale, AZ, Sept 24–25, 2019.
22. * "Fielded Systems: Lessons Learned," panel at: *11th Annual Conference of the Prognostics and Health Management Society (PHM2019)*, Scottsdale, AZ, Sept 24–25, 2019.
23. * "Addressing Hardware Security in Information Systems," **Keynote Speaker**, *Second International Conference on Machine Learning for Cyber Security (ML4CS2019)*, Xi'an, China, Sept 19–21, 2019.
24. "A Fusion Prognostics Model for Predictive Health Management of Railway Track Circuits," *17th International Probabilistic Workshop*, Edinburgh, UK, Sept 11–13, 2019.
25. * "AI in China: Advances and Challenges," Office of the Under Secretary for Science, August 21, 2019.
26. * "The Use of Prognostics and Systems Health Management for Reliable and Safe Operation of the Power Grid," *4th Purple Mountain Forum on Smart Grid Protection and Operational Control* (PMF-SGPC 2019), Nanjing, China, August 17-18, 2019.
27. * "IEEE 1624 Reliability Standard for Organizational Reliability Capability—What Is It and How Can It Help Your Company," Trends and Challenges in Reliability seminar, Eindhoven, The Netherlands, May 10, 2019.
28. * "Electronics Reliability: What the Best Companies Are Doing: The U.S. National Academy of Science Study," University of Houston, Feb 14, 2019.
29. * "The Era of Embedded Intelligence," **Keynote Speaker**, *1st International Conference on Computational Intelligence in Pattern Recognition (CIPR 2019)*, Indian Institute of Engineering Science and Technology, Howrah, West Bengal, India, Jan 19-20, 2019.
30. * "The Era of Embedded Intelligence," **Keynote Speaker,** *The 4th International Conference on Reliability, Safety and Hazard*, Indian Institute of Technology, Chennai, India, Jan 10-13, 2019.
31. * **Keynote Speaker**. *2018 8th IEEE International Conference on Power and Energy Systems.* Colombo, Sri Lanka, Dec 21-22, 2018.
32. * **"**Understanding and Predicting the Risk in Electronics Systems," **Keynote Speaker,** *The 20th International Conference on Electronic Materials and Packaging,* Hong Kong University of Science and Technology, Hong Kong, Dec 17-20, 2018.
33. * "FDA E-Cigarette Battery Considerations and Challenges," *2019 Global New Tobacco Product Innovation & Development Summit,* Shanghai New International Expo Center, Shanghai, China, Dec 8, 2018.
34. * "Heat not Burn Battery Considerations and Challenges," *2019 Global New Tobacco Product Innovation & Development Summit,* Shanghai New International Expo Center, Shanghai, China, Dec 7, 2018.
35. * "Why Suppliers Should No Longer Be Trusted for Reliable Products," **Keynote Speaker,** *2018 3rd International Conference on System Reliability and Safety*, Barcelona, Spain, Nov 24-26, 2018.
36. * "From the Explosion of E-Cigarettes to the Safety of Batteries," Keynote Speaker, *International Conference on Energy, Ecology and Environment, Swinburne University of Technology*, Hawthorn, Victoria 3122, Australia, Nov 21-25, 2018.
37. * "The U.S. Food and Drug Administration's Database of Medical Device Adverse Events: A Case Study of ESD Failures," **Keynote Speaker**, *2018 Taiwan ESD and Reliability Conference,* National Chiao Tung University, Hsinchu, Taiwan, Nov 7-9, 2018.
38. *"Electronics Reliability: What the Best Companies are Doing," *Development of Reliable Products Based on Physics of Failure*, Hovedstaden, Denmark, Oct 31, 2018.
39. * "Systems Health Monitoring and Management within the Internet of Things," **Keynote Speaker**, *Chinacom 2018 - 13th EAI International Conference on Communications and Networking in China,* Chengdu, China, Oct 23-25, 2018

40. * "Using AI based Data Analytics to Assess the Health and Predict the Reliability of Electronic Systems," *Hong Kong Electronic Forum- AI Enhanced Reliability and Functional Safety for Electronic System*, Hong Kong, Oct 15, 2018.
41. * "Todays' Three Big Challenges in Producing Reliable Products," *Smarter Electronics Systems Summit* and presentation for Scania, Stockholm, Sweden, Sept 11-12, 2018.
42. * "The Era of Embedded Intelligence," *14th Institute of Electronic Science and Technology of China,* Nanjing, China, Aug 24, 2018.
43. "Using IoT Output for Prognostics and Systems Health Management,"*2018 6th International Conference on Network Infrastructure and Digital Content (IC-NIDC 2018)*. Guizhou Huaxi Hotel, Huaxi District, Guiyang, China, Aug 22-24, 2018.
44. "The Era of Embedded Intelligence," Zhejiang University, Hangzhou, China, Aug 20, 2018.
45. * "Culture and Engineering for Social Change," Wuxi University, Wuxi Shi, Jiangsu Sheng, China, Aug 18, 2018.
46. "Advances in Battery Performance and Reliability Assessment," Dell Computers, Austin, TX, July 31, 2018.
47. * "Breaking the Trust: Why Companies are Failing their Customers," *The 18th IEEE Conference on Software Quality, Reliability, and Security*. Lisbon, Portugal, July 16-20, 2018.
48. * "Culture and Social Change," Beijing Jiaotong University, Beijing, China, June 11, 2018.
49. * "Battery Fires and Explosion Research," Beijing Institute of Technology, Beijing, China, June 10, 2018.
50. * "Embedded Sensor and Data Analytics," School of Information and Communication Engineering, Beijing University of Posts and Telecommunications," Beijing China, June 8, 2018.
51. * "Embedded Sensor and Data Analytics," Wuhan University, Wuhan, China, June 7, 2018.
52. * "Embedded Sensor and Data Analytics," Chinese Academy of Science -SIA, Shenyang, China, June 7, 2018.
53. * "Embedded Sensor and Data Analytics, Harbin, China, June 6, 2018.
54. * "Prognostics and Systems Health Management Advances and Trends," ISID- Microsoft PHM Conference, Tokyo, Japan, May 22, 2018.
55. * "IoT and Prognostics for Reliability," National Cheng Kung University, Taiwan, May 14, 2018.
56. * "Advances in Product Qualification and Supply Chain Responsibilities," **Keynote Speaker**, GOPE-2018 2nd International Conference on Gas, Oil and Petroleum Engineering, Houston, USA, Feb 26-28, 2018.
57. * "System Health Monitoring and Prognostics in the Internet of Things," Indian Institute of Engineering Science and Technology, Kolkata, India, Jan 9, 2018.
58. "The U.S. Food and Drug Administration's Database of Medical Device Adverse Events," **Keynote Speaker**, The 19th International Conference on E-health Networking, Application & Services, Dalian, China, October 12-15, 2017.
59. "State of the Art Advances in Supply Chain Management, Reliability Testing and Reliability Prediction," Quality Assurance of Electronic Hardware Seminar, Gothenburg, Sweden, Sept 8, 2017.
60. "Advances in Reliability Prediction, Testing and Supply Chain Management", Speaker, *SPMs 50 years anniversary seminar on Reliability Management*, Denmark, Sept 5-6, 2017.
61. "E-bike Battery Lifetime Factors & Warranty Concerns," *26th International Bicycle Trade Exhibition*, Friedrichshafen, Germany, Aug 30–Sep 2, 2017.
62. The "Prognostics-Based Qualification for Electronics Components and Systems," **Keynote Speaker,** *International Conference on Sensing, Diagnostics, Prognostics, and Control*, Shanghai, China, August 16-18, 2017.
63. * "Systems Health Monitoring and Management within the Internet of Things," **Keynote Speaker,** Hariot-Watt University Workshop on Embedded Intelligence", Edinburgh, Scotland, Aug 9, 2017.
64. "Asia Pacific Conference of the Prognostics and Health Management Society." Jeju, Korea, July 12-15, 2017.
65. * "Prognostics and System Health Management Conference", Harbin, China, July 09-12, 2017.
66. *"International Conference on Reliability Systems Engineering", Beijing, China, July 10-12, 2017.
67. "A New Application for Failure Prognostics – Reduction of Automotive Electronics Reliability Test Duration", PHM
68. "Prognostics-Based Qualification for Power Electronics", **Keynote Speaker,** *ECPE Workshop,* Condition and Health Monitoring in Power Electronics, Alborg, Denmark, July 4-5, 2017.
69. * "Systems Health Monitoring and Management within the Internet of Things," 9th EAI International Wireless Internet Conference, Haikou, China, Dec. 19, 2016.
70. "Systems Health Monitoring and Management within the Internet of Things," Guangdong University of Petrochemical Technology, Maoming, China, Dec. 17, 2016.
71. * Understanding and Predicting the Risks in Electronics, IEEE Italy, Milan, Nov 25, 2016.
72. * A Fusion Prognostics Approach to Qualification of Microelectronics" 2016 International Conference on Reliability and Science", Paris, France, Nov 15-18, 2016.
73. * Understanding and Predicting the Risks in Electronics, Naval Research Center, Washington DC, Nov 10, 2016.
74. *"Supply Chain Management and Electronic Parts Selection", KIMM Reliability Conference, Daejeon, Korea, Sept. 28, 2016.
75. *"Advances in Reliability", Toyota Research Institute of North America (TRINA) in Ann Arbor, MI, Sept 8, 2016
76. "Batteries and Battery Management Systems for e-Bikes", EuroBike, Friedrichshafen, Germany, Sept. 1, 2016.

77. * "Systems Health Monitoring and Management within the Internet of Things", **Keynote Speaker,** Comadem2016, Xian, China, Aug 19–23, 2016.
78. * "Systems Health Monitoring and Management within the Internet of Things", Cisco Internet of Everything Innovation Centre, Curtin University, Perth, Australia, June 21, 2016.
79. * "Prognostics and System's Health Management for Electronics Systems", Reliability Engineering Academy, Stuttgart, Germany, June 9, 2016.
80. * "Reliability Prediction Approaches", Huawei, Shenzhen, China, May 27, 2016
81. "Systems Health Management and Prognostics within the Internet of Things," Chongqing Technology and Business University, Chongqing, China, May 24, 2016.
82. * "Business Opportunities for Systems Health Management and Prognostics within the Internet of Things," **Keynote Speaker,** UNIST Symposium on Prognostics and System's Health Management, Ulsan, Korea, May 19, 2016.
83. "Advances in Qualification and Testing", Chinese Academy of Science – Shenyang Institute of Automation, Shenyang, China, May 11, 2016
84. "Advances in Microelectronics Qualification", Chinese Academy of Science – Institute of Microelectronics, Beijing China, May 9, 2016
85. "Systems Health Management and Prognostics within the Internet of Things," Lindburg Lectures Series, University of Wisconsin – Madison, April 28, 2016.
86. "Reducing Risk - Systems Health Management and Prognostics within the Internet of Things," College of Information Engineering, Capital Normal University, Beijing, China, April 20, 2016.
87. "Reducing Risk - Systems Health Management and Prognostics within the Internet of Things," Ulsan Institute of Technology, Ulsan, Korea, April 17, 2016.
88. *"How Cultural Differences Affect Communications, Friendships, and Business Relations," Yokohama National University, April 15, 2016.
89. "Systems Health Monitoring and Management within the Internet of Things," HKUST Shenzhen Research Institute, Shenzhen, China, March 16, 2016.
90. "Reducing Risk - Systems Health Management and Prognostics within the Internet of Things," **Keynote Speaker,** Institute of Advanced Sciences (IAS), Yokohama National University, Yokohama, Japan, March 3, 2016.
91. *"System Health Monitoring and Prognostics in the Internet of Things," Lahore University of Management Sciences, Lahore, Pakistan, Jan. 19, 2016.
92. *"Advances in Predicting Electronics Reliability," **Keynote Speaker,** 7th International Conference on Quality, Reliability, Infocom Technology and Business Operations, Delhi, India, Dec. 28–30, 2015.
93. *"A Perspective of the IPC Report on Lead-free Electronics," Symposium on Solder Interconnect Reliability, Singapore, Dec. 8–11, 2015.
94. *"Solar Energy: Can We Meet the Reliability Requirements for Cost Effective Implementation," **Keynote Speaker,** Lisbon, Portugal, Nov. 23–25, 2015.
95. "Understanding and Predicting Electronics System Reliability," CORPE - Aalborg University, Denmark, Nov. 18, 2015.
96. Jian Guo, Zhaojun Li, and Michael Pecht, "A Bayesian Approach for Li-Ion Battery Capacity Fade Modeling and Cycle to Failure Prognostics," NASA Aerospace Battery Workshop, Huntsville, AL, Nov. 17–19, 2015.
97. *"Prognostics in the Internet of Things," IEEE Workshop on Automation, **Keynote Speaker,** Shenzhen, China, Nov. 2, 2015.
98. *"How Cultural Differences Affect Communications, Friendships, and Business Relations," Guandong University, Maoming, China, Oct. 28, 2015; also Nanjing University, Oct. 26, 2015; also University of Science and Technology Beijing, Beijing, Oct. 23, 2015.
99. *"Understanding and Predicting Electronics System Reliability," **Keynote Speaker,** IEEE PHM 2015, 2015 Prognostics and System Health Management Conference, Beijing, China, Oct. 22, 2015.
100. *"Advances in Reliability," Undersecretary of Defense for Turkey, Ankara, Turkey, Sept. 16, 2015.
101. "Concerns with China as the World's Electronics Supplier," Software and Supply Chain Assurance Forum, McLean, VA, Sept. 1, 2015.
102. "Current Trends and Concern in System's Reliability," Mitre – Office of the Secretary of Defense, McClean, VA, Sept. 1, 2015.
103. "Prognostics in the Internet of Things," 2015 Smart World Congress, **Keynote Speaker,** Beijing, China, Aug. 10–14, 2015.
104. Presentation on Lithium Ion Battery Separators to U.S. Patent Office, for the USPTO's Patent Examiner Technical Training Program, July 28, 2015.
105. "PHM in the Internet of Things," Harbin Institute of Technology lecture series, Harbin, China, July 16, 2015.
106. "System's Engineering and Prognostics," University of Western Australia, Perth, Au, July 7, 2015.

107. *"Prognostics and Systems Health Management within the Internet of Things," **Keynote Speaker,** IEEE International Conference on CYBER Technology (IEEE-CYBER2015), Shenyang, China, June 8–12, 2015.
108. *"Understanding and Predicting Electronics System Reliability," **Keynote Speaker,** ICRESH-ARMS, Lulea, Sweden, June 4–6, 2015.
109. "Advanced Qualification and Accelerated Test Methods," State Key Laboratory of Solid State Lighting (Changzhou Base), Changzhou, China, May 13, 2015.
110. "Reliability and Systems Health Management," Smart Materials & Electronic Packaging Center, South China University of Technology, Guangzhou, China, May 12, 2015.
111. "Sensor Development, Prognostics and Data Analytics, and the Internet of Things," Shenyang Institute of Automation (SIA), Shenyang, China, March 10–13, 2015.
112. "Prognostics and Systems Health Management within the Internet of Things," **Keynote Speaker,** 2nd International Symposium on Physics & Technology of Sensors Conference (ISPTS-2), Pune, India, March 8–10, 2015.
113. *Battery Reliability and Safety," **Keynote Speaker,** 2014 the 4th International Conference on Power and Energy Systems (ICPES 2014), International Conference on Mechanical Manufacturing and Control (ICMMC 2014), Singapore, Nov. 22–23, 2014.
114. *Advances in the Reliability of LED Luminaires, **Keynote Speaker,** SIMTech AStar Conference on LEDs, Singapore, Nov. 19–20, 2014.
115. *Radiation Effect on Electronics, **Keynote Speaker,** 2014 International Conference on Particle Radiation Research and Applications, Taipei, Taiwan, Nov. 1–2, 2014.
116. *Advances in Battery Safety and Reliability, **Keynote Speaker,** International Forum on Reliability Engineering Applied to Power Battery, Taipei, Taiwan, Oct. 31, 2014.
117. *Prognostics and Systems Health Management within the Internet of Things, **Keynote Speaker,** Computing, Communications & Applications Conference - (ComComAp 2014), Beijing, China, Oct 20–24, 2014.
118. *Lessons Learned from the 787 Dreamliner on Lithium-ion Battery Reliability, **Keynote Speaker,** 27th International Congress of Condition Monitoring and Diagnostic Engineering Management (COMADEM 2014), Brisbane, Australia, Sept. 16 – 20, 2014.
119. "Battery Management Systems for e-Bike Safety", EuroBike, Friedrichshafen, Germany, Sept. 1, 2014.
120. Why the Best Companies are Monitoring the Health of Their Products and Systems, for Shenyang Institute of Aeronautics, Shenyang, Aug. 13, 2014.
121. *Why the Best Companies are Monitoring the Health of Their Products and Systems, **Keynote Speaker**, International Conference on Reliability, Maintainability and Safety (ICRMS), GuangZhou, China, Aug. 6-8, 2014.
122. *A Lead-Free Transition Plan for Safety and Reliability Critical Products, **Keynote Speaker**, International Conference on Challenges in IT, Engineering and Technology (ICCIET) Phuket, Thailand, July 17-18, 2014.
123. *A New Perspective on Electronic Product Reliability, Prognostics and Health Management, Emerson 2014 Technology Innovation and Growth Conference, June 23-25, 2014.
124. *Battery Prognostics and Safety Management, Nanjing University of Aeronautics and Aviation, Nanjing, China, June 12, 2014.
125. *Why the Best Companies are Monitoring the Health of their Products and Systems, Nanjing University of Aeronautics and Aviation, Nanjing, China, June 11, 2014.
126. *Why the Best Companies are Monitoring the Health of their Products and Systems, University of Science and Technology Beijing, Beijing China, June 10, 2014.
127. "Advanced Qualification of Automotive Electronics," International Seminar on Reliability Trends in ICT Combined Automotive Components, Korea Institute of Machinery & Materials (KIMM), Daejeon, Korea, May 14, 2014.
128. "Lithium Ion Battery Technology," China International Electric Vehicle and Parts Exhibition, Shanghai, China, April 13-16, 2014.
129. *Product Qualification and Supply Chain Responsibilities, 15th Electronics Packaging Technology Conf. (EPTC), Dec. 11, 2013.
130. Improved Battery Testability and Safety by Better BMS, China e-Bike Conference, Shanghai, China, April 13, 2014.
131. *Counterfeit Electronics: Sources and Solutions, Conf. on Enterprise and Supply Chain Management (ESCM 2013), Sanya, China, Dec. 4, 2013.
132. *Prognostics and System Health Monitoring for Battery Systems Reliability and Safety, **Keynote Speaker**, 8th World Congress on Engineering Asset Management (WCEAM) & 3rd Int'l Conf. on Utility Management & Safety (ICUMAS), Hong Kong, Oct. 30, 2013.
133. *A New Approach to Qualification, **Keynote Speaker**, IPC Southeast Asia Conf., Bangkok, Nov. 19, 2013.
134. *Using PHM to Keep the Dreamliner in the Clouds, **Keynote Speaker**, 2013 PHM Conference, Milan, Italy, Sept. 9, 2013.
135. *Using System Health Monitoring to Keep the Dream-Liner in the Clouds, **Keynote Speaker**, 8th International Conference on Communications and Networking, Guilin, China, Aug. 15, 2013.

136. *Prognostics and System Health Monitoring for Avionics Battery Systems Reliability and Safety, **Keynote Speaker**, 2013 Xi'an International Aviation Maintenance and Management Conference, Xi'an, China.
137. Recommendations on Life Estimation for Cochlear Implants, 2013 IEEE International Symposium on Product Compliance Engineering, ISPCE 2013.
138. Health Monitoring of Lithium-ion Batteries, 2013 IEEE International Symposium on Product Compliance Engineering, ISPCE 2013.
139. *How to Buy Counterfeit Electronics, **Keynote Speaker**, Counterfeit Electronic Parts and Electronic Supply Chain Symposium East, College Park, MD, June 25, 2013.
140. *Battery Management Systems- The Key Challenge to the Electric Vehicle, **Keynote Speaker**, Power and Energy Engineering Conference, Hainan Island, China, Jan. 1, 2013.
141. *Prognostics and Systems Health Management for Sustainability, **Keynote Speaker**, E-Maintenance Conference, Lulea, Sweden, Dec. 13, 2012.
142. *Prognostics and Health Management, **Keynote Speaker**, Helsinki, Finland, Dec. 12. 2012.
143. *Prognostics and Health Management, Universidad Simon Bolivar, Caracas, Venezuela, Nov. 26, 2012.
144. *Implementation of Prognostics and Systems Health Management by Industry, Japanese Society of Mechanical Engineering, Tokyo, Japan, Oct. 19, 2012.
145. *Aerospace Challenges and Research Opportunities, The Hong Kong Polytechnic University, Aug. 30, 2012.
146. *Prognostics and Health Management, China Electronic Produce Reliability and Environmental Testing Institute (CEPREI), Aug. 23, 2012.
147. * Advanced Qualification Methods, **Keynote Speaker**, 13th International Conference on Electronic Packaging Technology & High Density Packaging (ICEPT-HDP 2012), Guilin, China, August 13, 2012.
148. *Reliability Engineering in the Next Generation, **Keynote Speaker**, Conference on Reliability Engineering, Reliability Center in Rafael, July 2, 2012.
149. *Advances in PHM for Tomorrow's Industries, **Keynote Speaker**, IEEE Prognostics and Health Management 2012 Conference, Beijing, China, May 23, 2012.
150. *Battery Management Systems, IEEE Battery Management System Conference, Shenzhen, China, May 21, 2012.
151. *LED Color Failure Prediction using Spectral Power Distribution, HKUST LED-FPD Technology R&D Center at Foshan, Guangdong, China, May 18, 2012.
152. *Battery Health and Safety Management, **Keynote Speaker**, MFPT 2012: The Prognostics and Health Management Solutions Conference, Dayton, OH, April 24, 2012.
153. *Battery Management Systems- The Key Challenge to the Electric Vehicle, International Forum on Life Cycle Analysis of Electronic Devices, New Taipei City, Taiwan, April 19, 2012.
154. *Battery Management System- Advances in Prognostics, Taiwan NSF Forum, Taipei, TW, April 18, 2012.
155. *Prognostics and System Health Management, National University of Taiwan, April 17, 2012; NCUT April 16, 2012.
156. *Battery Management Systems- The Key Challenge to the Electric Vehicle, **Keynote Speaker**, 2nd International Conference on Electric Information and Control Engineering (ICEICE), Lushan, China, April 7, 2012.
157. *The Counterfeit Electronics Problem - Trying to Reach Harmony in a Storm, Int'l Conf. on Economics, Politics, and Security of China and the USA, Uni. Of MD, College Park, MD, Nov. 19, 2011 (televised live on Voice of America)
158. *APEC Workshop on Energy and Green Transport Benefits of Electric Vehicles, Hong Kong Science Park, Hong Kong, Oct. 25, 2011.
159. *The Role of China in the Counterfeiting of Electronic Products, DC Counterfeit Microelectronics Working Group, Washington, DC, Oct. 27, 2011.
160. *Apple's Best Practices, Lenovo, Beijing, China, Sept 21, 2011.
161. *Apple's Best Practices, Lenovo, Shanghai, China, Sept 19, 2011.
162. *A New Approach to Qualification, Keynote Speaker, 2011 IEEE International Conference on Quality and Reliability, Bangkok, Thailand, Sep. 16, 2011.
163. *Apple's Best Practices, Huawei, China, Sept. 13, 2011.
164. *Prognostic Methods for Military Systems, Naval Surface Warfare, Indian Head, MD, August 18, 2011.
165. *New Trends in Product Development Process, PSD Seminar, LG Research Institute, Pyungteak, Korea, July 25, 2011.
166. *Apple's Best Practices, Lenovo, Xiamen, China, July 23, 2011
167. Reliability Concepts, Life Cycle Profile, 1st Reliability and PHM Workshop, Korea, July 14, 2011.
168. *Reliability Testing of Electronics for Military Applications," Korean Defense Logistics Conf., Daegon, Korea, July 7, 2011.
169. *Re-Innovating the Qualification Process for the Electronics Industry, **Keynote Speaker**, 9th Int'l Conf. on Reliability, Maintainability and Safety, Guiyang, China, June 13, 2011.
170. *Advances in Prognostics, IEEE PHM Conference, Shenzhen- China, May 24, 2011.
171. *Counterfeit Electronics, Department of Energy Panel, Washington, DC, May 12, 2011.

172. *Implications of China's Growing Electronics Industry, Military Microelectronics Conf., Washington, DC, May 9, 2011.
173. *Counterfeit Electronics, UM School of Law Symp., Baltimore, MD, March 25, 2011.
174. R&D in China, Workshop on Energetics - Past and Present, Center for Energetic Concepts Development, Hong Kong Science and Technology Parks, Hong Kong, China, Dec. 8, 2010.
175. Prognostics and Health Management based Qualification, 4th Asia-Pacific Int'l Symp. on Advanced Reliability and Maintenance Modeling (APARM 2010), Wellington, New Zealand, Dec. 2, 2010.
176. ***Keynote speaker**, Nano- S&T 2011, Dalian, China, Oct. 23-26, 2011.
177. *The Impact of Free Air Cooling on Telecom Equipment, Lenovo, Beijing, China, Jan. 4, 2011.
178. *The Impact of Free Air Cooling on Telecom Equipment, Huawei and ZTE, Shenzhen, China, Dec. 29, 2010.
179. *Physics of Failure Based Reliability Analysis (with Dr. Diganta Das), ICRMS and Sanya, Hainan, China, Dec. 23-24, 2010.
180. *Advances in the Reliability of Lead-free Solders, Emerson, Hong Kong, Dec. 21. 2010.
181. * Prognostics and Systems Health Management for Improved Reliability, **Keynote speaker,** 7th China Manufacturing Management International Forum, Tianjin, China, Oct. 29, 2010.
182. * "Information Systems Safety and Availability – A New Time-Bomb". **Keynote address,** World Congress on Engineering Asset Management (WCEAM), Brisbane, Australia, Oct. 25, 2010.
183. * Prognostics and Systems Health Management for Improved Reliability, **Keynote address,** Electronic Systems, Institute for International Research XIII Kongres SUR, Poland, Oct. 19, 2010.
184. * Prognostics and Systems Health Management for Improved Reliability, **Keynote address**, International Education Forum on Reliability and Systems Engineering (IEFR&SE), Beihang University, Beijing, China, Oct. 15, 2010.
185. *Analyzing UA and Intermittent Failure Mechanisms, Committee on Electronic Vehicle Controls and Unintended Acceleration, The National Academies, Transportation Research Board, Washington, DC, June 20, 2010.
186. *Prognostics for Improved Qualification, presentation to Nissan, Japan, May 14, 2010.
187. *Prognostic Methods for IGBT Qualification, Japanese Society of Mechanical Engineering Consortium Meeting, Tokyo, Japan, May 11, 2010.
188. *Self-Cognizant Electronics for Long Life Reliability, Japanese Society of Mechanical Engineering Conf. on Long Life Project, Tokyo, Japan, May 10, 2010.
189. Power Electronics Prognostics, GE Global Research Workshop on Power Electronics Packaging & Reliability, Bangalore, India, Feb. 25, 2010.
190. *What's Happening with Electronic Product Reliability? **Keynote address**, the Maintenance & Reliability Conf. (MARCON 2010), Knoxville, TN, Feb 17, 2010.
191. *Does the Electronics Industry Need a New Approach to Qualification? **Keynote address**, Int'l Conf. on Electronics Packaging, Sapporo, Japan, Jan. 12-14, 2010.
192. Avionic PHM, the AVIC SAC/TC427 National Technical committee 427 on Process Management for Avionics of Standardization Administration of China, China, Jan. 10, 2010.
193. *Advances in Prognostics, Cranfield University, England, Nov. 27, 2009.
194. *Monitoring the Health of Electronic Systems, EADS, France, Nov. 26, 2009.
195. *Advanced Life Cycle Engineering, German Military COG, Munich, Germany, Nov. 25, 2009.
196. *Reliability Prediction Methods: What We Should Use and Not Use, IEEE Reliability Seminar & Workshop, University of Greenwich, London, UK, Sept 14, 2009.
197. *Health Management and Prognostics, GM Vehicle Health Management Workshop, Bangalore, India, Aug. 26, 2009.
198. A New Paradigm of Electronic Products Assessment, 2009 Int'l Conf. on Electronic Packaging Technology & High Density Packaging, Beijing, China, Aug. 10, 2009.
199. Prognostics and Health Management Special Forum, 2009 8th Int'l Conf. on Reliability, Maintainability and Safety (ICRMS 2009), Chengdu, China, July 20-24, 2009.
200. *Prognostics and Health Management Research, Technical University of Ostrava, Ostrava, Czech Republic, July 16, 2009.
201. *Prognostics and Health Management, Vehicle Maintenance & Repair Conference 2009, London, UK, July 14-15, 2009.
202. *Monitoring the Health of Products, University of Greenwich (Old Royal Naval College), UK, July 13, 2009.
203. *Prognostics and Health Management, National Semiconductor Corp., Hong Kong, July 8, 2009.
204. *Prognostics and Health Management, Huazhong University of Science and Technology, Wuhan, China, May 14, 2009.
205. *Prognostics and Health Monitoring for Improved Qualification, EuroSimE 2009, Netherland, April 27-29, 2009
206. Prognostics Implementation in Aerospace Applications, Condition-Based Maintenance and Health and usage Monitoring Symposium, Shrivenham, UK, April 21-22, 2009.
207. A New Perspective on Electronic Product Reliability, City University of Hong Kong, April 3, 2009.
208. *Prognostics and Health Management, CAPE, Beijing, China, March 2009.

209. *Prognostics and Health Management, Beihang University, Beijing, China, March 2009.
210. *Prognostics and Health Management, CEPREI, Guangzhou, China, March 2009.
211. *A New Approach to Qualification Testing, **Keynote Speech**, Electronics Packaging Technology Conference (EPTC) 2008, Singapore, Dec. 10, 2008.
212. *Health Management and Prognostics, **Keynote Speech,** 4th Dresden Airport Seminar, Structural Health Monitoring (SHM) and its Resources, Dresden, Germany, Nov. 6, 2008.
213. WCEAM Conference, Beijing, China, Oct. 27, 2008.
214. *A New Approach to Qualification Testing, **Keynote Speech**, IMPACT/EMAP, Taipei, Taiwan, Oct. 24, 2008.
215. Counterfeit Electronics, 2008 Fleck Connection Congress, Las Vegas, NV, Oct. 9, 2008.
216. * Health Management and Prognostics, IPC Midwest Conference, Schaumburg, IL, Sept. 20-25, 2008.
217. Prognostics-based Product Qualification for Advanced Microelectronic Systems, HKUST, Hong Kong, August 8, 2008.
218. *Advanced Prognostic Techniques, Beihang University Reliability Conference, Beijing, China, June 19, 2008; City University Quest Lecture, Hong Kong, June 23, 2008; Tayoma Prefecture University, Japan, June 25, 2008; NEC, Japan, June 26, 2008; IHI, Japan, July 15, 2008; Honda, July 17, 2008; Denso, July 18, 2008; Nissan, July 22, 2008; and Fujitsu, July 24, 2008.
219. *Reliability Engineering in the Next Generation, **Keynote Speech**, The 2nd IEEE International Conference on Secure System Integration and Reliability Improvement (SSIRI 2008), July 14, 2008.
220. *Key Reliability Challenges in Electronic Products and Systems, **Keynote Speech,** IEEE Safety and Security Conference, Japan, July 14, 2008.
221. *Advanced Prognostic Techniques, Hong Kong, China, June 23, 2008.
222. *Advanced Prognostic Techniques for Aerospace Applications, China Aerospace Institute, Shenyang, China, June 18, 2008.
223. *Advanced Prognostic Techniques for Aerospace Applications, CAPE, Beijing, China, June 17, 2008.
224. *Key Reliability Challenges in Telecommunications, Datung, Beijing, China, June 16, 2008.
225. *A New Approach to Qualification Testing, **Keynote Speech,** IEEE Int'l Reliability Physics Sym., Phoenix, AZ, April 29, 2008.
226. *A Modern Perspective of Conductive Filament Formation, TRW, MI, Dec 18, 2007.
227. *Contamination Induced Failures of Electronics, WL Gore, MD, Dec 17, 2007.
228. *Advanced Prognostic Techniques, JiaoTong University, Shanghai, China, Dec 9, 2007.
229. *Prognostics for Automotive Electronics, GM Conference on Diagnostics and Prognostics, Bangalore, India, Dec 3, 2007.
230. *Advanced Prognostic Techniques, GM internal R&D Conference on Diagnostics and Prognostics, Bangalore, India, Dec 1, 2007.
231. *Advances in Electronics Reliability, Microsoft, Shenzhen, China, Nov 29, 2007.
232. *China's Electronics Industry - What are the Risks to US Companies and Consumers, Dallas IEEE Reliability Society/Texas EDFAS Meeting, Richardson, TX, Nov. 15, 2007.
233. *The Use of Prognostics in Electronic Product, Int'l Microsystems, Packaging, Assembly and Circuits Technology Conference, Taipei, Taiwan, Oct. 1, 2007.
234. *New Methods to Predict Reliability of Electronics, **Keynote Speech**, MicroNanoReliability 2007, Berlin, Germany, Sept. 3, 2007.
235. Tin Whiskers: How to Mitigate and Manage the Risks, SMTA, China South Technical Conference, Shenzhen, China, August 27, 2007.
236. *New Methods to Predict Reliability of Electronics, **Keynote Speech**, ICRMS'2007, Beijing, China, August 23, 2007.
237. *Predicting the Reliability of Electronic Products, **Keynote Speech,** ICEPT 2007, Shanghai, China, August 15, 2007.
238. Electronic Product Reliability Diagnostics and Prognostics, City University of Hong Kong, August 3, 2007.
239. Data Analysis for System Reliability Diagnostics and Prognostics, Yokohama University, Japan, July 19, 2007.
240. *Tin Whiskers: How to Mitigate and Manage the Risks, **Keynote Speech,** 2007 International Sym. on High Density Packaging and Microsystem Integration (HDP'07), Shanghai, China, June 27, 2007.
241. Electronic PHM, GE Global Research PHM Conference, Niskayuna, NY, May 30, 2007.
242. IEEE 1413.1 - A Guide for Selecting and Using Reliability Predictions, Reliability Prediction- Understanding Techniques, Standards & the New Challenges, Institut Aeronautique et Spatial (IAS), Toulouse, France, May 4, 2007.
243. Prognostic Health Management, Reliability Prediction - Understanding Techniques, Standards & the New Challenges, Institut Aeronautique et Spatial (IAS), Toulouse, France, May 3, 2007.
244. Prognostics and Health Monitoring - The Brave New World, Health & Usage Monitoring & Condition-based Maintenance Sym., Defence Academy of the United Kingdom, Shrivenham, UK, May 1, 2007.
245. Prognostics Health Management, Defense Maintenance & Repair Conference, Arlington, VA, March 6-8, 2007.
246. Tin Whisker Bridging Across Electrical Conductors, 2nd International Eco-Electronic Conference, Beijing, China, December 7, 2006.

247. *IEEE Reliability Prediction Standards and the Handbook based Reliability Prediction Methods, Reliability Prediction for Military Electronic Equipment and Systems, Beijing, China, December 6, 2006.
248. *Electronic Health Monitoring, Emerson Materials and Manufacturing Forum, Coronado Springs, FL, November 8, 2006.
249. *Prognostics Health Management, Halliburton Reliability Conference 2006, Houston, TX, November 1, 2006.
250. *Providing the End-to-End Connection for the Sustainment Value Chain, 2006 DoD Maintenance Symp., Reno, NV, October 24, 2006.
251. *Prognostics and Sense and Respond Logistics, 2006 DoD Maintenance Symp., Reno, NV, October 23, 2006.
252. *Enabling Electronic Prognostics Using Thermal Data, 12th Int'l Workshop on Thermal Investigations of ICs and Systems (THERMINIC 2006), Nice, France, Sept. 27, 2006.
253. Todays and Future Challenges Concerning Lead-free Electronics, **Keynote Speech,** 1st Electronics Systemintegration Technology Conf. (ESTC 2006), Dresden, Germany, Sept. 6, 2006.
254. Advances in Prognostics for Electronic Products and Systems, 2006 Int'l Military & Aerospace/Avionics COTS Conference, Aug. 22, 2006.
255. Tin Whiskers: How to Mitigate and Manage the Risks, 2006 Int'l Military & Aerospace/Avionics COTS Conference, Aug. 21, 2006.
256. *Prognostics and Health Management, Prognostics and Health Management Sym., **Keynote Speech**, Exeter, UK, July 9, 2006.
257. *Accelerated Testing: Ways to Understand Reliability Quickly and Accurately, **Keynote Speech**, IMAPS-Taiwan 2006 Int'l Technical Sym., Taipei, Taiwan, June 30, 2006.
258. *Advances in Canaries, Precursors, and Physics-of-Failure Based Prognostic Techniques in Fielded Electronics Applications, Lockheed Martin Prognostics and Health Management Conference, Bethesda, MD, June 7, 2006.
259. A New Prognostics Method for Extending the Life of Legacy Systems, IMAPS Topical Workshop on Military, Aerospace, Space and Homeland Security: Packaging Issues and Applications (MASA 2006), Washington, DC, June 7, 2006.
260. *Prognostics for Electronics, 2nd Annual Raytheon Enterprise Logistics Solutions Conf., Manhattan Beach, CA, May 17, 2006.
261. *Prognostic Technology Benchmarking, EADS, Paris, France, Feb. 28, 2006.
262. *Theory and Practice of Prognostic and Health Management, Reliability 2006 Conference, Seoul, Korea, Feb. 21, 2006.
263. *The Impact of the Growing Chinese Electronics Industry on the Future of Aerospace, Boeing, Seattle, WA, Dec. 21, 2005.
264. *The Story Behind the Red Phosphorus Mold Compound Device Failure, **Keynote Lecture,** EMAP 2005, Tokyo Institute of Technology, Tokyo, Japan, Dec. 12, 2005.
265. *Prognostics and Health Monitoring, Mirce Akademy, Exeter, UK, Nov. 30, 2005.
266. *Health Monitoring of Electronic Systems, Airbus, Bristol, UK, Nov. 29, 2005.
267. *Market Access and Electronics Products Development in China, United Nations, Geneva, Switzerland, Nov 24, 2005.
268. *IC Reliability in Low Volume Production, DoD Advisory Committee on Electron Device (AGED), Nov. 26, 2005
269. What are the Proper Accelerators for Predicting the Reliability of Active Implantable Medical Devices? Workshop on Measurement Methods for Evaluation of the Reliability of Active Implantable Medical Devices, NIST, Gaithersburg, MD, October 4, 2005.
270. *China's S&T Policy, **Keynote Speech**, For China Industry and Government Directors Meeting, University of Maryland, Sept 29, 2005.
271. *Theory and Practices of Prognostics Health Management, **Keynote Speech,** China Government, Industry and University workshop, Beijing, China, Sept. 5, 2005.
272. Health Monitoring of Electronic Products, Yokohama National University, Yokohama, Japan, Jan. 19, 2005.
273. Long-term Lead-free Product Analysis, JEITA, Japan, Jan 18, 2005.
274. Using Failure Mechanism Based Analysis for Physics-of-Failure assessment, Toshiba, Japan, Jan. 18, 2005.
275. China's Electronics Industry, Fleck Connection Congress, Anaheim, CA, October 28, 2004.
276. *Advances in Reliability and Maintainability Research, **Keynote Speech**, 6th Int'l Conf. on Reliability Maintainability & Safety, Xi'an, China, Aug. 26, 2004.
277. Sensors, NEMI 2004 Technology Roadmap Workshop, Washington, DC, June 23, 2004.
278. Reliability of Lead-free Electronics, 2004 Int'l Conf. Addressing on WEEE & RoHS Directives & the Third Int'l Conf. on WEEE Recycling, Guangzhou, China, June 11, 2004.
279. *Product Reliability and Liability: Business and Legal Aspects of Product Procurement, 2004 Int'l Conf. on the Business of Electronic Product Reliability and Liability, Shanghai, China, April 29, 2004.
280. *The Reliability of Next Generation Electronics, **Keynote Lecture**, Materials Congress 2004, London, UK, March 30, 2004.
281. *IEEE 1413 and Reliability Prediction Methods, JSME, Japan, Jan. 16, 2004.

282. *Auditing the Reliability Capability of Electronic Manufacturers, Tokyo Institute of Technology, Tokyo, Japan, Jan. 15, 2004.
283. In-situ Health Monitoring of Electronics, National Central University, Taiwan, Dec. 29, 2003.
284. * Reliability Analysis and Prediction Methods, Shanghai Jiao Tong University, Shanghai, China, October 23, 2003.
285. * Electronics Aging Assessment and Prediction, Workshop on Aging and Long-term Reliability of Microelectronics Materials and Devices (sponsored by the Air Force Office of Scientific Research), Vanderbilt University, Nashville, TN, October 9, 2003.
286. * Lead-Free Solder Patents, Emerson Lead-Free Solder Sym., Aug 21, 2003; IPC/Maxtor Conf., Aug. 20, 2003; also IEEE Public Lecture, Hong Kong, June 24, 2003; also Shenzhen, China, July 2, 2003; also IEEE Int'l Conf. on Electronics Packaging, Tokyo, Japan, April 17, 2003.
287. * The New IEEE Reliability Prediction Standards, UK Ministry of Defense Reliability Conf., April 3, 2003.
288. Uprating: the Dilemma between Semiconductor Manufacturers and Users, Commercialization of Military & Space Electronics Conf., Los Angeles, CA, Feb. 11, 2003.
289. * Auditing the Reliability Capability of Electronics Manufactures, **Keynote Presentation**, Int'l IEEE Conf. on the Business of Electronic Product Reliability and Liability, Hong Kong, Jan. 14, 2003.
290. * The New IEEE Standards on Reliability Program and Reliability Prediction Methods for Electronic Equipment, City University of Hong Kong, Hong Kong, Jan. 9, 2003.
291. * The Technical, Social and Legal Outlook for Lead-Free Solders, **Keynote Presentation,** IEEE Int'l Sym. on Electronic Material and Packaging, Kaoshiung, Taiwan, Dec. 3-6, 2002.
292. * Challenges for Adopting Pb-Free Interconnects for "Green" Electronics, **Key-Note Presentation,** IPC/JEDEC Int'l Conf. on Lead-Free Electronic Components and Assemblies, Taipei, Taiwan, Dec. 10-12, 2002.
293. * IEEE Reliability Prediction Standard for Devices and Systems, **Keynote Presentation**, ESREF Int'l Conf., Rimini, Italy, Oct 7-11, 2002.
294. Sensors Used for Health Monitoring of Electronic Products and Systems, National University of Singapore, Singapore, July 24, 2002.
295. Mechanics Solution-Methodologies to Electronic Packaging, Cambridge University, UK, July 4, 2002.
296. * Reliability of Electronics and Photonics-Components and Systems, **Keynote Presentation**, EPPIC Conf., Scotland, UK, July 3, 2002.
297. * In-situ Semiconductor Health Monitor for Product Reliability Monitoring, **Keynote Presentation**, IEEE/SPIE Design, Test, Integration and Packaging MEMS/MoEMS, Cannes, France, May 6-8, 2002.
298. * Life Consumption Monitoring, **Keynote Presentation,** UK-Ministry of Defense R&M Specialists' Seminar, Malvern, United Kingdom, April 25-26, 2002
299. The Business, Product Liability and Technical Issues Associated with Using Electronic Parts Outside the Manufacturer's Specified Temperature Ranges, City University of Hong Kong, Hong Kong, March 4, 2002
300. * The Business, Product Liability and Technical Issues Associated with Using Electronic Parts Outside the Manufacturer's Specified Temperature Range, **Keynote Presentation,** Pan Pacific Microelectronics Sym. and Tabletop Exhibit, Maui, HI, pp. 391-398, Feb. 5-7, 2002.
301. Capturing the Benefits of Disruptive Innovation in E-Business Supply Chain Management, 2001 Int. Conf. on Supply Chain Management and Information Systems, Hong Kong, Dec. 14-18, 2001.
302. * Electronics Reliability Engineering in the 21st Century, **Keynote Presentation**, The 3rd Int'l Sym. on Electronic Materials and Packaging 2001, Jeju Island, Korea, Nov. 18-23, 2001.
303. Electronics R & M - Physics of Failure, Lecture, Istanbul Technical University of Turkey, Turkey, July 27, 2001.
304. Electronics Reliability Engineering in the 21st Century, Public Lecture, City University of Hong Kong, Hong Kong, China, June 29, 2001.
305. China's Semiconductor Industry, Electronic Packaging Industry Development in China, Taiwan, and Hong Kong Sym., Shanghai, China, April 2, 2001.
306. Reliability in the New Millennium, Festschrift Conf., University of Wisconsin; Sept. 29 - 30, 2000.
307. Writing in the Brave New World; Professional Writing Program - Fall Faculty Development Day, University of Maryland, Aug. 29, 2000.
308. Preparing for a Time-to-Profit Economy, Feddersen Distinguished Lecture in Mechanical Engineering, Purdue University, West Lafayette, IN, Feb. 21, 2000.
309. Reliability of Electronic Products in the 21st Century, Motorola, IEEE CPMT Society, IL, July 28, 1999.
310. Electronic Devices for Reliable Defense Applications, US Office of Secretary of Defense (OSD), July 23, 1999.
311. COTS Analysis Methods, DoD Scientific Advisory Board Meeting on COTS, Reston, VA, June 8, 1999.
312. * Virtual Component Qualification, **Keynote Presentation**, MSM '99, Puerto Rico, April 1999.
313. Reliability of Electronic Devices for Defense Applications, Reliability STAR, Palisades Institute, Arlington, VA, Feb. 23, 1999.

314. Reliability in the 21st Century, Focus on Electronic Products and Systems, IEEE Boston Reliability Chapter, Dec 9, 1998.
315. Characterization of Plastic Encapsulant Materials as a Baseline for Reliability Testing-Moisture Content and Ionic Contamination, POLY '98, The Electrical and Electronic Packaging Division, ASME Int'l, Dec. 1,1998
316. Recent Developments in China's Electronic Industry, ISEPT '98, Beijing, China, Aug. 17-21, 1998.
317. Strategies for Rapid Technology Implementation, SEMICON/WEST 98, Semiconductor Equipment and Materials Int'l, July 15, 1998.
318. Invited speaker on NEWSNIGHT MARYLAND, Maryland Public Television, June 8, 1998.
319. Plastic Packages - Status and the Future, The Reliability Challenge, Dublin, Ireland, May 19, 1998.
320. Moving Toward Virtual Qualification, Dependability '98, Ottawa, Canada, May 12-14, 1998.
321. Reliability Assessment Trends for the 21st Century, Electronic Packaging 1998, Stockholm, Sweden, March 17 1998.
322. Decreasing the Time-to-Market Through Virtual Risk Assessment and Risk Mitigation, Smiths Industries, Clearwater, FL, Feb. 10, 1998.
323. Decreasing the Time-to-Market Through Virtual Risk Assessment and Risk Mitigation, Harris Semiconductors, Palm Bay, Melbourne, FL, Jan. 8-9, 1998.
324. Decreasing the Time-to-Market Through Virtual Risk Assessment and Risk Mitigation, NAE: National Materials Advisory Board: Irvine CA, Nov. 13-14, 1997.
325. Reducing Qualification Time for Higher Reliability Microelectronics Packages and Interconnects, Key Development Series in Microelectronics & Electronic Packaging Workshop, ISHM-IMAPS, Santa Fe, NM, Nov. 12, 1997.
326. Accelerated Risk Assessment and Mitigation, Nokia Research Center, Finland, Oct. 2, 1997.
327. Design for Quality and Reliability, Compaq Computer Corp., Houston, TX, Sept. 26, 1997.
328. Electronics as an Integrated Technology Across Engineering Disciplines, Joint ASME-IEEE Lecture Series, Houston, TX, Sept. 25, 1997.
329. * The Developing Electronics Device Market Place and its Impact on Procurement and Reliability, **Keynote Presentation**, The Royal Aeronautical Society, London, UK, Sept. 18, 1997.
330. * Decreasing the Time-to-Market Through Virtual Risk Assessment and Risk Mitigation, **Keynote Presentation**, 21st Int'l Conf. on Microelectronics, Nis, Yugoslavia, Sept. 16, 1997.
331. Moisture Results, BGA Substrate PTAB Meeting, Sematech, Durham, NC, Aug. 6, 1997.
332. Decreasing the Time-to-Market Through Virtual Risk Assessment and Risk Mitigation, Strategic Research Program Seminar, Nanyang Technological University, Singapore, July 23, 1997.
333. * Decreasing the Time-To-Market through Virtual Risk Assessment and Risk Mitigation, **Keynote Presentation**, InterPak'97, Island of Hawaii, HI, June 16, 1997.
334. Southeast Electronics Industry, InterPACK 1997, Mauna Lani, Kohala Coast, Island of Hawaii, June 15-19, 1997.
335. Long Term Dormant Storage Modeling of Plastic Encapsulated Microcircuits, Army-Micom, June 4, 1997.
336. Rapid and Effective Reliability Risk Assessment and Risk Mitigation, Motorola Corporate Engineering Council 1997 Simulation and Modeling for 10X Cycle Time Reduction Sym., Chicago, June 3, 1997.
337. Obtaining Electronic Systems Quality and Reliability in the 21st Century, Computing Devices Int'l, Bloomington, MN, May 19, 1997.
338. Reliability Test Planning, Sematech and IPC Substrate PTAB Meeting, Austin, TX, April 29, 1997; also Denver, CO, Feb. 6, 1997.
339. Obtaining Quality and Reliability in Automotive Industry, GM, Warren, MI, April 18, 1997.
340. Technology Reinvestment Project - Work Force Retraining in Manufacturing Science and Engineering of Cost-effective and Reliable Electronics, NSF Engineering Education Innovators' Conf., Arlington, VA, April 8, 1997.
341. R&M Within the 'Tiger Economy' Nations of the Pacific Rim, MoD Reliability and Maintainability Specialists Seminar, Oxfordshire, England, March 13-14, 1997.
342. The Electronic System Development in the 21st Century, Johns Hopkins University, March 10, 1997.
343. Reliability Modeling and Testing, Second Joint Conf. on Electronic Packaging Education, Ithaca, NY, Sept. 30 - Oct. 1, 1996.
344. Introduction and Background of Boeing ECMP Philosophy, Smiths ECMP Meeting, Malvern, PA, Sept. 19, 1996.
345. Materials Information for the Electronics Industry, NIST Metallurgy Division Strategic Planning Session for Data Projects/Programs, Gaithersburg, MD, Sept. 5, 1996.
346. Issues in the Long Term Dormant Storage of PEMs, 1996 Advanced Electronics Acquisition, Qualification, and Reliability Workshop, Schaumburg, IL, Aug. 21-23, 1996.
347. Reliability Issues in Thermal Design, National Heat Transfer Conf., Houston, TX, Aug. 3-6, 1996.
348. ASA Electronic Business in Transition Military to Non-Mil. Parts Allied Signal Phoenix, AZ, June 6, 1996.
349. Shattering the Myths of Electronic Reliability, 1996 Spring Quarter Woodruff Seminar Series, Georgia Institute of Technology, Atlanta, GA, May 23, 1996.

350. Plastic Encapsulated Microcircuits, The Hardness Assurance Committee of the NASA/AFSMC Space Parts Working Group, Alexandria, VA, May 20-22, 1996.
351. Physics of Failure and Environmental Effects, 43rd Institute of Environmental Sciences Annual Technical Meeting and Expo, Los Angeles, CA, May 15, 1996.
352. * The Next Decade of Reliability Engineering, **Keynote Presentation**, Ministry of Defence R&M Specialists Seminar, Steeple Aston, Oxon, England, March 28, 1996.
353. Shattering the Myths of Electronics Reliability, National Center for Ultra-Reliability Engineering (Strategic Surety) Seminar, Sandia Labs, Albuquerque, NM, March 21, 1996.
354. The Part Selection Processes, Semiconductor Industry Association (SIA) Government Procurement Committee Meeting, Seattle, WA, Feb. 26, 1996.
355. Reducing the TimetoMarket Using Simulated Qualification, IBM, Poughkeepsie, NY, Feb. 21, 1996.
356. * Cost-effective Reliability Assessment, **Keynote Presentation**, ISHM - India, EMIT 1996, Bangalore, India, Feb. 14, 1996.
357. Cost-effective Reliability Assessment, High Density Packaging User Group, Palo Alto, CA, Feb. 6, 1996.
358. Popcorning in Full and Perimeter Plastic Ball Grid Array Packages during IR Reflow Soldering, Munamarty, R. and M. Pecht, Area Array Packaging Technologies, Workshop on Flip Chip and Ball Grid Arrays, Berlin, Germany, Nov. 13-15, 1995.
359. Can We Build-in Reliability Without Physics of Failures? **Keynote Presentation**, 1995 IEEE Int'l Integrated Reliability Workshop, Lake Tahoe, CA, Oct. 22-25, 1995.
360. * Bringing An Electro-Technology To Market, **Keynote Presentation**, Micro-Integrated Smart Materials and Structures Conf., (MISMSC), Williamsburg, VA, Oct. 12, 1995.
361. Attaining High Reliability in Low-Cost Electronic Systems, Thermal Management of 21st Century Electronic Systems Center for the Development of Technological Leadership, NSF Workshop, Minneapolis, MN, Oct. 10, 1995.
362. * Advances in Heat Transfer, **Keynote Presentation**, Fourth Int'l Flotherm User Conf., San Jose, CA, Oct. 4, 1995.
363. * Temperature As a Reliability Factor, **Keynote Presentation**, Eurotherm Conf. No. 45, Leuven, Belgium, Sept. 19-23, 1995.
364. Packaging Research Efforts at the University of Maryland Packaging Research Center, Motorola Semiconductor Packaging Technology Steering Committee Meeting, Arlington Heights, IL, July 18, 1995.
365. Japanese Government and Industry Collaboration in Electronic Packaging R&D, Semicon/West 95, San Francisco, July 6-13, 1995.
366. Problems and Alternatives to NASA's Component Reliability Assessment Methodology, CIMSS/SSEC Seminar, Madison, WI, July 7, 1995.
367. Physics of Failure Reliability Methods, General Motor's NAO Technical Center, Warren, MI, June 15, 1995.
368. Influence of Fiber Glass-Resin Interface on Reliability of Electronic Packaging Laminates, Fiber Glass Research Center Technical Seminar, O'Hara, PA, April 27, 1995.
369. Research in the Design of Reliable Electronic Products, Delco Electronics, Kokomo, IN, April 19, 1995.
370. Advances in the Design and Assessment of Reliable Microelectronics, ETRI, KAIST, Korea, April 3, 95; also LG Semicon, Korea, April 4, 1995; also Daewoo Electronics, Korea, April 6, 1995.
371. Int'l Developments in Packaging Technology, panel speech, Int'l Intersociety Electronic Packaging Conf., HI, March 29, 1995.
372. * Physics of Failure, **Keynote Presentation**, Ministry of Defence R&M Specialists' Seminar, Steeple Aston, Oxon, United Kingdom, March 2-3, 1995.
373. Recent Trends in the Design and Qualification of Electronic Products, Motorola Corporate Manufacturing Research Center (CMRC), Schaumburg, IL, Nov. 22, 1994; also Motorola, Phoenix, AZ, Nov. 28, 1994.
374. Recent Trends in the Design and Qualification of Electronic Products, Dy4 Systems, Inc., Ontario, Canada, Nov. 4, 1994.
375. Comparison of Electronic Packaging Trends in the U.S. and Southeast Asia CALCE EPRC Research Review Meeting, October 19-21, 1994.
376. Reliability Program Standard to Replace Mil-Std-785, EIA G-41 R&M Committee, Fall 1994 Meeting, College Park, MD, Oct. 17, 1994.
377. A Physics-of-Failure Approach to Addressing Device Reliability in Accelerated Testing, Lall, P. and M. Pecht, 5th European Sym. on Reliability of Electron Devices Failure Physics and Analysis, Glascow, Scotland, Oct. 4-7, 1994.
378. * Success Factors in the Malaysian, Taiwanese and Japanese Electronics Industry, **Key-Note Presentation**, Surface Mount Int'l Conf. & Exposition, San Jose, CA, Aug. 28 - Sept. 1, 1994.
379. Computational Methods to Address Reliability of Electronic Packaging, The Third World Congress on Computational Mechanics, Chiba, Japan, Aug. 1-5, 1994.
380. Possible Missed Opportunities for the Use of PEMs by the Military, Office of Secretary of Defense, Case Studies Sym. on the Successful Use of Commercial Integrated Circuits in Military Applications, June 13-15, 1994.

381. Commercial Versus Military Practices, panel and open forum, 40th Institute of Environmental Science Annual Technical Meeting and Expo, Chicago, IL, May 3, 1994.
382. Dual Use GaAs Technology: A Reliability Approach, 1994 U.S. Conf. on GaAs MANufacturing TECHnology, Tropicana, Las Vegas, NV, May 1-5, 1994.
383. A Computerized Physics-of-Failure Approach to Reliability Assessment, 1994 Utica Conf. & Technology Expo, Springfield, MA, April 28, 1994.
384. The Influence of Temperature on Integrated Circuit Failure Mechanisms, MCC, Austin, TX, March 22, 1994.
385. A Physics-of-Failure Approach to Reliability Assessment, ESL, San Jose, CA, March 2-3, 1994.
386. Design & Verification of Safe, Reliable and Robust Airplane Systems, 40th Reliability and Maintainability Sym., Anaheim, CA, Jan. 27, 1994.
387. A Physics-of-Failure Approach to Derating, SRC Electronic Packaging Program Kick-off Meeting, Atlanta, GA, Jan. 14, 1994.
388. Design and Simulation Tools for Electronics Packaging, Industry/University Case Study Panel II: Design and Integration Engineering, 1994 NSF Design and Manufacturing Grantees Conf., MIT, MA, Jan. 5-7, 1994.
389. The Physics-of-Failure Approach, NASA Johnson Space Flight Center, Houston, TX, Dec. 22, 1993.
390. Lall, P., Pecht, M., Cushing, M. and T. Stadterman, Physics-of-failure Based Computer Tools for the Design of Microelectronic Packages, 1993 Avionics Conf. and Exhibition, London, UK, Dec. 1-2, 1993.
391. IEEE Reliability Program Standard: Revising MIL-STD-785, New Directions in Military Reliability Availability and Maintainability (RAM) Symp: The American Defense Preparedness Association, Aberdeen Proving Ground, MD, Oct. 19, 1993.
392. Rudra, Balu and M. Pecht, Conductive Filament Formation: A Focus on MCM-L Substrates, IPC Fall Meeting, Washington, DC, Oct. 1993.
393. M. Pecht, Reliability Issues for MCM-L, IPC Short Course, IPC Fall Meeting, Washington, DC, Oct. 1993.
394. M. Pecht, Computer-Aided Reliability, Design and Assessment of MCMs: A Physics of Failure Based Approach, 1993 Advanced Microelectronics Qualification/Reliability Workshop, Denver, CO, Aug. 24-26, 1993.
395. Best Commercial Parts and Practice Seminar, Honeywell Inc., Clearwater, FL, Aug. 17, 1993.
396. Electronics Reliability Trends, Indian Government Electronics, SAMEER, Bombay, India, Aug. 5, 1993.
397. Advances in the Design and Assessment of Reliable Electronics Using Concurrent Engineering, U.S./R.O.C. Workshop on Automation and Productivity for Small to Medium Scale Manufacturing Industry, July 1993.
398. Avionics Design Process: Military and Commercial, NAECON 93, Dayton, OH, May 24-27, 1993.
399. A Changing Paradigm in the Design of Reliable Electronics, United Technologies Engineering Coordination Activities (UTECA) Conf., April 29, 1993.
400. Reliability Assessment of Plastic Packages, Litton Quality and Reliability Seminar, Greenbelt, MD, April 20, 1993; also DoD Workshop on Plastic Packages, Bloomington, IN, Nov. 4-5, 1992.
401. Reliability Assessment for Predictive Maintenance, Martin Marietta Energy Systems, Second Annual Prediction Maintenance Forum, Knoxville, TN, March 25, 1993.
402. Future Trends in Plastic Packaging, 39th Reliability and Maintainability Sym., Atlanta, GA, Jan. 25, 1993.
403. Needed Change in Military Standards, Quality Day, RAFAEL Ministry of Defense, Haifa, Israel, Nov. 14, 1992; also AGED STAR Workshop, Alexandria, VA, March 2-5, 1992.
404. Electronics R & M - Physics of Failure, Lecture, MIRCE Akademy, Exeter, UK, July 23, 2001.
405. Thermal Challenges in Electronics Packaging, ASME Winter Annual Meeting, Anaheim, CA, Nov. 8-12, 1992.
406. Influence of Temperature on Microelectronic Device Failure Mechanisms, Keynote Speaker: IEEE-ISHM-IEPS Advanced Technology Workshop, Aug. 25, 1992.
407. The Physics-of-Failure Approach to Multi-chip Module Design and Assessment, Nippon Steel-Electronics, Tokyo Japan, July 27, 1992, Toshiba, Kawasaki, Japan, July 28, 1992, Matshushita Electric Works, Osaka, Japan, July 29, 1992, Matshushita Electric Industries, Osaka, Japan, July 30, 1992, Matshushita Electric Corporation, Osaka, Japan, July 31, 1992.
408. Pecht, M. and M. Cushing, Should MIL-STD-785 Have A More Science-Based Foundation, Proc. American Defense Preparedness Association Sym., pp. 76-87, Aberdeen, MD, June 16-17, 1992.
409. Round Table on Multi-chip Modules, SME Round Table, Mansfield, MA, June 23, 1992.
410. Cost Effective Design of Reliable Electronic Equipment, for AMSAA Senior Analysts Review, Aug. 12-13, 1992; Comanche PMO and Contractors, May 7, 1992; Darold Griffin, PADRA, AMC HQ, May 7, 1992; Walt Hollis, Deputy Undersecretary of Defense Army, April 17, 1992; Brig. General Mullen, April 4, 1992; Stephen Burdt, Pentagon, April 24, 1992; Mr. Vitali, LABCOM Technology Director, Jan. 8, 1992.
411. An Electronics Packaging Compiler, MCM Workshop, Navy EMPF, IN, Feb. 18-19, 1992; also DARPA-MADE Workshop, Salt Lake City, UT, Jan. 26-28, 1992.
412. Integrating Thermal Analysis of Electronics with Design, ASME Winter Annual Meeting, Atlanta, GA, Dec. 1-6, 1991.

413. Software for Concurrent Engineering, NASA Electronic Packaging and Processes Working Group, Nov. 22, 1991; also State of Maryland Technology Forum, Nov. 6, 1991.
414. Manufacturing in Education and Research, ASEE Middle Atlantic Fall Meeting, College Park, MD, Nov. 2, 1991.
415. MIL-HDBK-217 Issues, Naval Weapons Support Center, Crane, IN, Oct. 31 - Nov. 1, 1991.
416. Pecht, M. and C. Leonard, An Approach to Improved Electronics Reliability, 1991 Advanced Microelectronics Technology Qualification, Reliability, and Logistics Workshop, Seattle, WA, Aug. 13-15, 1991.
417. What Will It Take For The Military to Design Cost-Effective Reliable Products, Engr. For Electronics Design and Production Sym., Bloomington, IN, June 25-27, 1991.
418. Bhandarkar, S., Dasgupta, A., Pecht, M. and D. Barker, Non-Linear Thermo-Mechanical Properties of Fabric Reinforced Printed Wiring Boards, 5th Int'l SAMPE Electronics Conf., June 18-20, 1991.
419. How Failure Prediction Methodology Affects Electronic Equipment, GE Sym. on Reliability in Electronic Systems, Schenectady, NY, June 13-14, 1991.
420. Putting Science Into Reliability Prediction, for Boeing Commercial Airplanes and Boeing Aerospace, June 5-6, 1991.
421. Hu, J. and M. Pecht, Experimental Evaluation of the Mechanical Behavior of GaAs Wafers, Materials Research Society Symp. 8 pages, April 23 - May 3, 1991.
422. Advances in Assessment of Electronics Reliability, Ford Motor Co., Dearborn, MI, April 15, 1993; also Plenary Speaker, 47th Meeting of the Mechanical Failure Prevention Group, Virginia Beach, VA, April 13, 1993; also United Technologies, Hartford, CT, Oct. 24, 1992; also SUNY-Binghamton, Oct. 1, 1992; also Honeywell Reliability Advisory Board Meeting, July 9, 1992; also Dallas IEEE Reliability Society, May 19, 1992; also 25) Institute of Statistical Sciences, Academica Sinica, Taipei, Taiwan, Nov. 27, 1991; also Luncheon Speaker at SEMITHERM VII Sym., Feb. 12-14, 1991.
423. What Every Electrical Engineer Should Know About Mechanical Reliability, IEEE Reliability Society, Baltimore, MD, Jan. 16, 1991.
424. Cooling of Avionics for Tactical Fighter Aircraft, AIAA/ASME Joint Thermophysical Conf., Seattle, WA, June 1820, 1990.
425. Osterman, M. and M. Pecht, Placement for Reliability Based on Physics of Failure Concepts, 90 IEEE NAECON Conf. Vol. 3, pp. 10211027, May 21-25, 1990.
426. Reinhart, H. and M. Pecht, Automated Design for Maintainability, 17th IEEE InterRam Conf., pp. 230236, June 1215, 1990; update of, Proc. 90 IEEE NAECON Conf., Vol. 3, pp. 12271232, May 2125, 1990; update of Proc. 6th Annual RAMCAD Conf., pp. 215-238, April 26, 1990.
427. Bhandarkar, S., Dasgupta, A., Pecht, M. and D. Barker, Effects of Voids in Solder Filled Plated Through Holes, IPC Technical Paper TP863, 33rd IPC Conf., April 16, 1990.
428. Computer Aided Life Cycle Engineering of Electronic Equipment, Pecht, M. and R. Porter, NSF Sym. on Industry/University Collaboration: Models for Success, Washington, DC, Feb. 28, 1990.
429. Hevner, A., Basu, A., Pecht, M. and B. Pourbabai, A Methodology for Concurrent Product Development with a Focus on Electronic Products, Proc. Second National Sym. on Concurrent Engineering, Morgantown, WV, Feb. 7-9, 1990.
430. Reliability In Education, 36th Reliability and Maintainability Sym., Los Angeles, CA, Jan. 23-25, 1990.
431. NSF Industry/University Cooperative Research Center Directors, Washington, DC, Jan. 11-12, 1990.
432. CALCE: A Systems Approach to Reliable Electronics Design, Science Council Seminar Series, Martin Marietta Laboratories, Dec. 6, 1989.
433. Current Trends in Reliability Predictions of Electronic Components, Department of Mechanical and Industrial Engineering, SUNY at Binghamton, Oct. 26, 1990; also New Jersey Chapter of the Reliability Society, ITT Avionics Auditorium, Clifton, NJ, Sept. 19, 1989.
434. 217E, AVIP and Beyond, IEEE-ISHM Annual Reliable Electronics Packaging Workshop, College Park, MD, Oct 2-3, 1990, also IEEE R&M Workshop, Taipei, Taiwan, June 1-2, 1990; also Leesburg, VA, Aug. 25-26, 1989.
435. Reliability Engineering Education, Reliability Conf., West Point Academy, NY, Nov. 5, 1989; also USAF RAMCAD Curricula Workshop, Arlington, VA, June 14-15, 1989.
436. Concurrent Design: A Life Cycle Engineering Approach, Digital Equipment Corp., Maynard, MA, Jan. 17, 1989.
437. Azarm, S., Pecht, M., Li, W. and S. Praharaj, A Decompositionbased Design Optimization Method with Applications, Second NASA/Air Force Sym. on Recent Experiences in Multidisciplinary Analysis and Optimization, pp. 1055-1067, Hampton, VA, Sept. 2830, 1988.
438. SIG Knowledge Engineering in Mechanical Design and Manufacturing, Minneapolis, MN, Sept. 15-16, 1988.
439. RAMCAD Workshop IV, Westinghouse DEC, Baltimore, MD, June 8-9, 1988.
440. Thermal/Reliability Management, Surface Mount Technology Sym. and Workshop, University of Maryland, April 21, 1988.
441. M. Pecht, Distributed Tasking in RAMCAD, Proc.: 4th Annual RAMCAD Technical Interchange Meeting, San Diego, CA, April 19-20, 1988.

442. M. Pecht, Concurrent Design, CALS EXPO '88, National Institute of Standards and Technology, Gaithersburg, MD., Oct. 46 1988; Concurrent Design in RAMCAD, Proc. IEEE 1988 Reliability and Maintainability in Computer Aided Engineering, pp. 4548, Leesburg, VA, Sept. 27-29, 1988, Reliability Integration Techniques In Electronics Design, ASQC and SME Product Assurance Forum '87, Rock Island, IL, Oct. 6-7, 1987.
443. Sawyer, B. and M. Pecht, Database and Process Control for the RAMCAD Workstation Environment, IEEE Workstation Technology and Systems Conf., May 11-12, 1987.
444. Pecht, M., Palmer, M., Sawyer, B., Porter, R. and W. Rivera, Using an Expert System in the Computer Aided Design of PWB's for Improved Reliability, Artificial Intelligence Conf. on The Role of A.I. in Military Systems, Westinghouse Defense Electronics, Baltimore, MD, Dec. 3-5, 1986.
445. An Application of RAMCAD to Printed Circuit Board Design, GTE, Needham, MA, Oct. 24, 1987. Northrop Corporate CAE Group, Hawthorne, CA, July 15, 1987; also RAMCAD A Tool for Second Level Electronic Package Design, Devices and Circuits Seminar Series, University of Maryland, Oct. 31, 1986; also The RAMCAD Project, VITRO Corporation, Silver Spring, MD, June 13, 1986 also Computer Aided Printed Circuit Design For Reliability, IEEE Reliability Society, Washington, DC, Mar. 18, 1987; also The ULCE/Landing Gear Design Application, LockheedGeorgia Company Presentations, with Lee Madison (Lockheed GA), GA, Mar. 1617, 1987; also, An Application of RAMCAD to PCB Design, IDA Second RAMCAD Technical Interchange Meeting, Institute for Defense Analyses, Alexandria, VA, Oct. 21-22, 1986.
446. Pecht, M. and E. Vanin, Computer Aided Modeling of the DNA Nucleosome Interaction, Int'l Conf. on Modeling and Simulation, AMSE, Vol. 3, pp. 180-187, Sept. 3-5, 1986.
447. Hsu, G., Palmer, M. and M. Pecht, Simulation of Marangoni Convection in an Electrically Conducting Fluid in the Presence of a Magnetic Field, Int'l Conf. on Modeling and Simulation, AMSE, Vol. 3, pp. 116-128, Sept. 3-5, 1986.
448. M. Pecht, General Design, AAAI Workshop on Knowledge Based Expert Systems for Engineering Design, Lawrence Livermore National Laboratory, Livermore, CA, Aug. 22, 1986.
449. Pecht, M., Osterman, M. and K. Strickler, The Effect of a Varying Moisture Content on the Stress Relaxation Response of Kraft Paper, NSF Workshop on Paper Physics and Int'l Paper Physics, Aug. 10-15, 1986.
450. Advanced Applications of Computer Aided Design Systems, The Leading Edge of Computer Aided Design Sym., College Park, MD, Nov. 15, 1985.
451. Intelligent Design of Printed Wiring Boards, Association for Computing Machinery: 24th Annual Technical Symp: Intelligent Systems, National Bureau of Standards, Gaithersburg, MD, June 20, 1985.
452. Anand, D., Kirk, J., Anjanappa, M., and M. Pecht, Supercomputers and Hierarchical Control: A Systems Viewpoint, Supercomputers in Mechanical Systems, Lawrence Livermore National Laboratory, CA, Sept. 12-14, 1984.
453. Humidity Stress Strain Interactions in Corrugated Container Sheets, Technical Association of the Pulp and Paper Industry at the U.S. Department of Agriculture, Forest Products Laboratory, Madison, WI, Feb. 8, 1983; also Humidity Stress Strain Interactions in Cellulosic Specimens, Institute of Paper Chemistry, Appleton, WI, Jan. 9, 1983.

National and International Short Courses

1. The Safety-related Challenges of Using Li-ion Batteries, Electronics Division, On-line lecture, Chongqing University, July 1, 2022
2. AI-based Reliability Science, Arcelik Conference, Istanbul, Turkey, October 20, 2019.
3. Advances in Supply Chain Management and PHM, Sodertalje, Sweden, Sept 11, 2018.
4. Probability Distributions, Chinese Academy of Science, Shenyang, China, June 6, 2018.
5. Advances in PHM, ISID short course for Japanese companies, Tokyo, Japan, May 23, 2018.
6. Supplier Trust: presentation for Emerson (online), May 14-15, 2018.
7. Advances in Reliability: short course for Abbott Medical, Los Angeles, April 12, 2018.
8. Advances in Reliability: short course for Roketsan, Ankara, Turkey, Nov. 21-22, 2016.
9. Advances in Reliability: short course for Philips Medical, Oct. 28, 2016.
10. Electronics Reliability: A Science and Technology Issue or a Supply Chain Issue?, Sandia National Labs, New Mexico, Sept. 13, 2016.
11. Fundamentals of Reliability Engineering, for Chinese Academy of Science, Shenyang, China, Aug. 23, 2016.
12. Advanced Reliability Methods, for Schlumberger, Katy, Texas, Apr. 11, 2016.
13. Test Methods for Rapid Qualification, Symposium on Solder Interconnect Reliability, Singapore, Dec. 8, 2015.
14. Advanced Reliability Methods and Supply Chain Management, Ankara, Turkey, Sept. 17–18, 2015.
15. Advancements in Qualification and Accelerated Testing, at Continental facilities, Tijera, Mexico, July 28, 2015.
16. Product Qualification and Supply Chain Responsibilities, IEEE International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems (EuroSimE 2015), Budapest, Hungary, April 19, 2015.
17. Why the Best Companies are Monitoring the Health of their Products and Systems, Reliability Outreach Seminar & Workshop, Politecnico di Milano, Milano, Italy, Nov. 28, 2014.
18. Physics of Failure, Stratsys, MN, Sept. 4, 2014.
19. Advances in RoHS, Emerson Corporate Seminar, St Louis, Sept. 3, 2014.
20. Counterfeit Electronics, Emerson 2014 Technology Innovation and Growth Conference, June 23–25, 2014.
21. Advanced Qualification of Microelectronics, 2014 ECTC, Orlando, USA, May 27–30, 2014.
22. Product Qualification and Supply Chain Responsibilities, 3rd Micro / Nano Electronics Packaging and Assembly Forum, Grenoble, France, May 20–23, 2014.
23. Advanced Qualification of Automotive Electronics, International Seminar on Reliability Trends in ICT Combined Automotive Components, Daejoon, Korea, May 14, 2014.
24. Product Qualification and Supply Chain Responsibilities, 15th Electronics Packaging Technology Conf. (EPTC), Singapore, Dec. 11, 2013.
25. Prognostics and System Health Management, KIMM, Korea, Mar. 13, 2013.
26. Parts Selection and Supply Chain Management, Teradyne, Costa Rica, Feb. 28- Mar. 1, 2013.
27. Current Research and Industrial Applications in the Area of Advance Life Cycle Engineering, Tampere University of Technology, Finland, Dec. 11, 2012.
28. Prognostics and Health Management, Israeli Users' Association of Advanced Technologies in Hi-Tec Integrated Systems (ILTAM), Israel, July 3, 2012.
29. PHM for LEDs, Philips-Lumileds, Feb. 6–7, 2012.
30. Advanced Reliability Methods, Prognostics and System Health Monitoring, Emerson Network Systems, Aug. 17, 2011; Emerson Network Systems, Shenzu, China, Jan. 19, 2012; Emerson Network Systems, Philippines, Jan. 25, 2012.
31. Reliability and Testing Issues with FR-4 Circuit Boards, Underwriters Laboratory, Tokyo, Japan, June 29, 2011.
32. China's Electronics Industry, NSA, MD, June 17, 2011
33. Advanced Reliability Methods, Prognostics and System Health Monitoring, Capital Normal University of Beijing, China, June 7, 2011; also Harbin Institute of Technology, June 8, 2011.
34. Physics of Failure Approach for Prognostics and Health Management, University of Maryland, College Park, MD, March 23, 2011.
35. China's Electronics Industry, a short course presented by M. Pecht and L. Zuga, University of Maryland, College Park, MD, Oct. 18, 2010.
36. Prognostics for Information Systems, CALCE-CityU-PHM Society short course, Shenzhen, China, May 19-20, 2010.
37. Advanced Reliability Methods, Prognostics and System Health Monitoring, LG Electronics, Seoul, Korea, May 17–18, 2010.
38. Going beyond the U.S. Food and Drug Administration: How can China Benefit from Past Experience? CityU Centre for Prognostics and System Health Management, Hong Kong, Nov. 10, 2009.
39. Advanced Qualification Methods and Prognostics, Bosch, Detroit, MI, Sept. 24-25, 2009.
40. Prognostic and Health Management, Lenovo, Beijing, China, July 27, 2009.

41. A New Growth Strategy in Technological Transformation for China's Electronics Industry, ICRMS 2009, Chengdu, China, July 20, 2009.
42. Prognostics and Health Management for Telecom Equipment, Ericsson, Sweden, Nov. 9-12, 2008.
43. Reliability and Prognostics, Schlumberger - France, Nov. 6-9, 2008.
44. Advanced Qualification and Testing Methods, FDA Special Topics in Reliability Course, MD, Oct. 7, 2008.
45. Diagnostics and Prognostics of Medical Devices, FDA Special Topics in Reliability Course, MD, Sept. 30, 2008.
46. Counterfeit Electronics, FDA Special Topics in Reliability Course, MD, Sept. 23, 2008.
47. Lead-free Electronics, FDA Special Topics in Reliability Course, MD, Sept. 16, 2008
48. Reliability Problems that Arise in Products Having Complex Supply-Chains, FDA Special Topics in Reliability Course, MD, Sept. 9, 2008.
49. Qualification and Screening of Electronics, Schlumberger, Japan, July 23, 2008.
50. Qualification Methods, Yokohama University, Japan, July 16, 2008.
51. Reliability and Prognostics, Schlumberger, Japan, June 13, 2008.
52. Reliability and Prognostics, Schlumberger, Houston, TX, May 16, 2008.
53. Impact of EU Thermal Requirements on Telecomm Equipment, Huawei, Shenzhen, China, April 29, 2008.
54. Screening and Burn-in Methods, Huawei, Shenzhen, China, April 12, 2007.
55. Complying with Environmental Legislation, Emerson Materials and Manufacturing Forum, Coronado Springs, FL, Nov. 9, 2006.
56. Risks in RoHS Implementation, CEPREI, Guangzhou, China, July 17, 2006; CTTL, Beijing, China, July 18, 2006; CQC, Beijing, China, July 19, 2006.
57. Are you Really Ready for RoHS and WEEE? A Course on Tin Whiskers and Flame Retardants, Hong Kong, April 14, 2006.
58. Conductive Filament Formation in Electronic Circuit Cards, Astec, China, Dec. 7, 2005.
59. Conductive Filament Formation in Electronic Circuit Cards, Rosemont, Emerson, Nov. 17, 2005.
60. Assessing Reliability of Products Subject to Harsh Environment and High Temperatures, IMAPS Nordic, Tonsberg, Norway, Sept. 14, 2005.
61. Electronics Assembly Reliability Analysis and Test Technologies, ICEPT, Shenzhen, China, Aug. 30, 2005.
62. Reliability Training Course, CEPREI, Guangzhou, China, Aug. 25, 2005.
63. Lead-free Business Discussion, Arbitron, Columbia, MD, Aug. 10, 2005.
64. Reliability Training Course, Medtronic, Tempe, AZ, June 6-7, 2005.
65. Lead Free Soldering, Schlumberger, TX, May 16, 2005
66. Supply Chain Management, Hong Kong, April 22-24 and April 29-30, 2005.
67. Reliability Training Course, Emerson Network Power System, Shenzhen, China, April 18-22, 2005.
68. Reliability Training Course, ACEL, Beijing, China, Sept. 1-3, 2004.
69. Monitoring the Health (Reliability) of Products, Hong Kong University of Science and Technology (IEEE CPMT Hong Kong Chapter), Hong Kong, June 9, 2004.
70. Reliability Methods, Avansys, Shenzhen, China, Jan. 12, 2004.
71. IEEE Reliability Standards, Schlumberger, Houston, TX, Dec. 19, 2003.
72. Lead-Free Development for the Oil Industry, Halliburton, Houston, TX, Nov. 3, 2003.
73. Lead-Free IP Issues, Emerson Electronics, MO, Aug. 21, 2003.
74. IEEE Reliability Prediction Standard 1413, COTS Conf., MA, Aug 26, 2003.
75. Parts Selection and Management, Kollmorgen, MA, Aug. 25, 2003
76. Electronics Reliability, KAIST Short Course, Daichon, Korea, July 3, 2003.
77. Contacts and Connectors, Hong Kong, June 23, 2003; also Shenzhen, China, July 1, 2003.
78. Electronics Reliability, Halliburton, Houston, TX, March 6, 2003.
79. Part Selection and Management, Technobit, Spain, July 6, 2002.
80. How to Select and Use Electronic Parts Outside the Manufacturer's Specified Temperature Range (Uprating), Technobit, Spain, July 5, 2002.
81. Using Reliability Predictions for Telecom Systems Designs, IMAPS/SMTA Conf., May 16, 2002.
82. Reliability and Physics of Failure, United Defense, MN, April 16-17, 2002.
83. Reliability Training Course, City University of Hong Kong, Hong Kong, March 7, 2002.
84. Practical Reliability Engineering - Special Focus on Electronics, Huawei Electronics, Shenzhen, China, Nov. 2001.
85. Device Encapsulation Reliability Issues, Medtronic, Tempe AZ, Oct. 4, 2001.
86. Parts Selection and Management, Hamilton-Sundstrand, Hartford, CT, Sept. 13, 2001.
87. Part Selection and Management, ASCO, A Division of Emerson, Hong Kong, June 27, 2001.
88. Practical Reliability Engineering - Special Focus on Electronics, City University of Hong Kong, Hong Kong, China, June 20- 22, 2001.

89. How to Select and Use Electronic Parts Outside the Manufacturer's Specified Temperature Range (Uprating), Public Offering, European Conf.: Military and Space Electronics Conf., Brussels, Belgium, Sept. 25, 2000.
90. Introduction of Electronics in an Electro-Mechanical World -- How to Achieve Reliability in An Electronic Module, Sixth AMC Technology Conf., Battelle Memorial Institute, Columbus, OH, May 3-4, 2000.
91. How to Select and Use Electronic Parts Outside the Manufacturer's Specified Temperature Range (Uprating), Public Offering in conjunction with Commercialization of Military and Aerospace Electronics, Los Angeles, CA, Jan 30, 2000.
92. Next Generation of Electronic Parts - Processes, Tests, Applications and Risks, Hong Kong Productivity Center Seminar, Hong Kong, China, Nov. 12, 1999.
93. Parts Selection and Management, Israel, Oct 21, 1999.
94. How to Select and Use Electronic Parts Outside the Manufacturer's Specified Temperature Range (Uprating), Raytheon, Rhode Island, Aug 26, 1999.
95. How to Select and Use Electronic Parts Outside the Manufacturer's Specified Temperature Range (Uprating), Allied Signal, Tucson, AZ, Aug 25, 1999.
96. Next Generation of Electronic Parts-Processes, Tests, Applications and Risks, 1999 Military/Aerospace (Transportation) COTS Conf., Berkeley, CA, Aug 24, 1999.
97. How to Select and Use Electronic Parts Outside the Manufacturer's Specified Temperature Range (Uprating), Rockwell Collins, Cedar Rapids, Iowa, June 2, 1999.
98. How to Select and Use Electronic Parts Outside the Manufacturer's Specified Temperature Range (Uprating), General Dynamics Information Systems, Minnesota, May 11-12, 1999.
99. Advanced Plastic Encapsulated Microelectronics Course, Storage Technologies, Denver CO, Jan. 28-29, 1998.
100. Reliability Concepts and Fundamentals, short course for Microsoft, Redmond, WA, Jan. 14-15, 1999.
101. Plastic Packages - Status and Future The Reliability Challenge, Finn Jensen Reliability Consultancy and Shannon Quality Training, Dublin, Ireland, May 19,1998.
102. Advanced Plastic Encapsulated Microelectronics Course, Haifa, Israel, Dec. 9-10, 1997.
103. Advanced Plastic Encapsulated Microelectronics Course, Scottsville, AZ, Aug. 19, 1997.
104. Printed Wiring Board Failure Mechanism Workshop, College Park, MD, Aug. 15, 1997.
105. Second Electronic Components Management and Uprating Workshop, CALCE Electronic Packaging Research Center, University of Maryland, College Park, Aug. 4-5, 1997.
106. Physics of Failure: An Approach to Reliability Design and Assessment, Tutorial: 6th Int'l Sym. on the Physical & Failure Analysis of Integrated Circuits, Singapore, July 21-25, 1997.
107. Advanced Plastic Encapsulated Microelectronics Course, Eglin Air Force Base, May 29, 1997.
108. Advanced Plastic Encapsulated Microelectronics Course, GEC-Marconi Research Center, England, March 12, 1997.
109. Plastic Encapsulated Microelectronics Course, AlliedSignal, Towson, MD, Feb. 25-26, 1997.
110. Advanced Plastic Encapsulated Microelectronics Course, Lockheed Martin Tactical Communication System, Salt Lake City, UT, Nov. 19-20, 1996.
111. Technology Overview, Javelin Millile PEM IPT, Lewisville, TX, Nov. 15, 1996.
112. Using PEM's in High Reliability Application, AlliedSignal, Kansas City, MO, Oct. 8-9, 1996.
113. Design for Reliability - a PoF Approach, for GM Saturn, Troy, MI, Sept. 25, 1996.
114. Advanced Plastic Encapsulated Microelectronics Course, Schaumburg, IL, Aug. 20, 1996.
115. Component Screening, The Int'l Workshop on Failure Rate Modeling for Reliability Prediction, Zurich, Switzerland, June 21, 1996.
116. Hybrid Microcircuit and Multichip Module Packaging Technologies, UCLA short course, Los Angeles, CA, May 8-10, 1996.
117. Plastic Encapsulated Microelectronics Course, M/A-COM, MA, April 11-12, 1996.
118. Plastic Encapsulated Microelectronics, Materials, Processes, Tests, Reliability and Applications, College Park, MD, March 19-20, 1996; Sept. 12-13, 1995; May 24-25, 1995; and March 15-16, 1995.
119. Physics of Failure, Army Research Laboratory, Fort Monmouth, NJ, Feb. 20, 1996.
120. Physics of Failure, Hobbs Engineering, Inc., Orlando, FL, Feb. 2, 1996; Santa Clara, CA, Sept. 25, 1995; Boston, MA, June 13, 1995 and Denver, CO, March 13, 1995.
121. Plastic Encapsulated Microelectronics Course, Hazeltine Corp., NY, Oct. 16, 1995.
122. The Physics-of-Failure Approach to Reliability Assessment, 1995 IEEE Multi-Chip Module Conf., Santa Cruz, CA, Jan. 31, 1995.
123. Ball Grid Array Versus Fine Pitch: Comparing Device to Card Assembly Issues Strengths and Weaknesses, Fifth Annual Electronics Packaging Sym., Binghamton, NY, July 18-19, 1994.
124. Multichip Hybrid Packaging for High Data Rates, Continuing Engineering Education Program, George Washington University, Washington, DC, July 11-13, 1994.
125. The Influence of Temperature on Integrated Circuit Failure Mechanisms, I-Therm '94 Pre-Conf. Course, Washington, DC, May 4, 1994.

126. Reliability Modeling and Improvement, a course for the European telecommunications industry, Harlow, United Kingdom, March 16-17, 1994.
127. Perspective on Physics-of-Failure Approach to Reliability, a course for the European avionics industry, Hampshire, United Kingdom, March 17, 1994.
128. A Physics-of-Failure Approach to Reliability Assessment, Northern Telecom, Ottawa, Canada, Feb. 21, 1994.
129. Electronic Packaging in Japan, Japanese Technology Evaluation Center Workshop, Arlington, VA, Jan. 12, 1994.
130. High Density Microcircuit Packaging, University of Maryland Center for Continuing Education, Baltimore, MD, Nov. 15-17, 1993.
131. MCM-L Reliability Issues, IPC Workshop, Washington, DC, Oct. 24, 1993.
132. Electronic Packaging, United Nations: UNIDO Program, Madras, India, Aug. 3-5, 1993.
133. Reliability of Cost Effective Multi-chip Modules, Industrial Technology Research Institute, Taiwan, July 8, 1993.
134. Reliability Issues in Microelectronic and PWB Packages, ASME Program No. 102-12-9309, PD-242, Santa Clara, CA, June 21-22, 1993; also ASME Program No. 91786, Course No. 242, Fort Worth, TX, April 16-17, 1991; also ASME Program No. 90756, Course No. 242, San Jose, CA, June 26-27, 1990; also at the Industrial Technology Research Institute (ITRI), Taiwan, May 24-25, 1990.
135. Procuring and Using Plastic Encapsulated ICs Best Commercial Practice Microcircuits in High Reliability Applications, College Park, MD, June 16-18, 1993.
136. Cost Effective Design and Assessment Issues for Modern Electronic Packages, half day course, Quality Assurance Conf., Israel, Nov. 16, 1992.
137. Int'l Course on Reliability Issues in Electronic and Engineering Industries, Jakarta, Indonesia, Aug. 4-5, 1992.
138. Reliability: The Key to Product Success, 1 of 6 Presenters, NTU Advanced Technology and Management Program, College Park, MD, June 18-19, 1992.
139. Total Product Assurance, M. Pecht and D. Raheja, NTU Advanced Technology and Management Program, Course No. MC91100A1, College Park, MD, Oct. 1-2, 1991.
140. The Physics of Failure Approach to Reliability, Third Annual SAE Int'l Reliability, Maintainability and Supportability Workshop, Dallas TX, May 6-8, 1991.
141. Introduction to AVIP, Full day course for the Air Force, MITRE and Rockwell, Dallas, TX, April 23, 1991.
142. Introduction to Reliability and Safety Engineering, Hardware and Software, University of Maryland Center for Professional Development, College Park, MD, Apr. 9-11, 1990.
143. Reliable Design of Electronic Devices, CALCE and SRC sponsored course, College Park, MD, Nov. 14-16, 1989.
144. RAMCAE/CALS: Integrating R & M into the Design Process, U.S. Army Management Engineering College Defense Management Course, Topic: Tools for Integrating R&M with CAE, Rock Island Army Arsenal, IL, Feb. 22-24 1989.
145. A Mechanical Engineering Approach to Electronics Design, ASME Course No. 172905, Orlando, FL, Oct. 25-27, 1989; also ASME and University of Maryland cosponsored short course, Oct. 2527, 1988.
146. Reliability Engineering, Management and Maintainability, Center for Professional Development Program, University of Maryland, July 1014, 1989; also Oct. 1114, 1988; also May 26-31, 1988.
147. Design For Reliability and Maintainability, Lockheed-Georgia Company, Marietta, GA, Aug. 18, 1987.
148. The Design and Analysis of Reliable Printed Wiring Boards: A Mechanical Engineering Viewpoint, Sponsored by the Engineering Research Center of the University of Maryland, June 1618, 1986.
149. Reliability Engineering Workshop, Sponsored by Center of Reliability Engineering, College Park, MD, March 11, March 31 and April 14, 1986.
150. Applications of Expert Systems in Computer Aided Design, Computer Science, University of Maryland, College Park, MD, Nov. 13, 1984.

TEACHING AND ADVISING

Courses taught:

ENME 101	Computer Engineering: F86
ENME 300	Material Science: F83
ENME 321	Heat Transfer: F88, S93
ENME 360	Vibrations: S84
ENME 404	Engr. Design: F83
ENME 480	Engr. Experimentation: F83, S84, F84, S85, F85, S86, F86, F87, S88, F88, S89, F89, S90, F90, S91, S92, F92, F94, S95
ENME 482	Engineering for Social Change, F17, F18, F19, (guest lecturer)
ENME 489	Special Projects: S84, SU84, F84, S85, SU85, F85
ENME 489/808	Product Reliability - Concepts, Processes, Tests, and Applications: S86, S88, S89, S90, S96, F97, S00, S02, S03, S05, S07, S08
ENME 601	Microprocessors: S85, F85, S87
ENME 612	Advanced Electronics Packaging: F91, S93, S94,
ENME 690	Mechanical Fundamentals of Electronic Systems: F02, F03, F05
ENME 695	Design for Reliability: S03, S06, S07, S09, S10, S11, S12, S13, S14, S15, S17, S18, S19, S20, S21
ENME 737	Prognostic & Health Management: F06, F07, F09, F10, F11, F12, F13, F14, F16, F17, F19, F20, F21
ENME 808A	Batteries- Operation, Modeling, and Reliability: F18
ENME 808X	Extreme Temperature Electronics: F92, F96
ENME 808X	Plastic Encapsulated Microelectronics: S95, S97, F98, F02
ENME 808X	Materials in Electronics: F99

Advising: Other than Research

Reviewer: Division of Research VPR: W.M. Keck Foundation Research Program Proposals: June 2018

Thesis Committees (last 5 years only)

Served on the PhD Dissertation Examination Committee for Chu Xu, August, 2021.

Served on the PhD Dissertation Examination Committee for Ms. Areen Abdallah Allataifeh, United Arab Emirates University, Feb. 2019.

Served as reviewer for concept papers on behalf of Division of Research at WM Keck Foundation competition, June 2018

Served on George K. Winstead (Co-Advisor along with Dr. David C. Jenn) in MS Thesis, Naval Postgraduate School, Monterey, California, USA, Sept. 2017.

Served as external examiner for Ph.D student, Mohamed Halick Mohamed Sathik of Nanyang Technological University (NTU), Singapore in June 2017